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This Week in The Iron Age

MAY 15, 1941

VOL. 147, NO. 20

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The Iron Age

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MAY 15, 1941

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ESTABLISHED
1855



Pig Iron and Ingot Mines

THE spirit of fun pervades most occupations in America, fortunately, and part of it finds expression in hazing or "putting one over" on a beginner or apprentice. I remember quite vividly, although it was some years ago, being sent through the aisles of a railroad shop to get a left handed monkey wrench for the mechanic whose helper I had just become.

Later on, in the publishing business, I participated with others in selling shares in a pig iron mine to a cub advertising salesman who was so devoid of industrial information that he probably thought that shoes grew on shoe trees. That he learned fast, however, is evidenced by the fact that this man now owns and runs some very successful publications.

Many a word spoken in jest turns out to have actually been spoken in earnest, although its speaker was totally unaware of it. And there may be more in this pig iron mine business than appears on the surface. Also in steel ingot mines.

Suppose right now, for example, we could dig down into the earth and bring up pigs of iron and ingots of steel instead of having to go through the process of mining ore and coal for smelting and melting. What a help that would be, particularly, after a month's coal strike and when the industry is being pushed for every last ton of production.

I mentioned this thought, in a jocular way, to a steel man recently and was surprised to find that he took it seriously. "Man," said he, "you've got something there."

"Government," he continued, "has for years been buying up the productive surplus of farm products and storing them, awaiting the day to come when it could sell them below cost or give them away. And Government has been buying the world's surplus of gold at a premium and burying it at Fort Knox. If Government had only done that with pig iron and steel ingots, what a nice position we would be in today!"

Silly, is it not? But perhaps not as silly as it seems.

Government purchase of surpluses can have but two sound objectives. One, as in the farm surplus matter, is to ameliorate the impact of under demand and over supply upon the producer and his labor. The other is to provide for an emergency in which demand may exceed capacity to produce. Neither of these, of course, applies to the gold buy and bury plan.

It takes a long time to turn gold into tanks or projectiles or airplane engines through the route of purchase and production and even gold won't do it when you can't get iron or steel to do it with.

If our Government had kept our steel mills running by purchasing their potential surpluses of ingots up to an 85 per cent production rate during the 22 years ended in 1940, we would now have some 404 million tons of steel buried underground ready to dig up and put to immediate use. Wouldn't that be something.

John H. Van Dusen



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Priorities and the Plater

By ADOLPH BREGMAN
Consulting Engineer, New York

—Or, what to do when
anodes and plating salts
become scarce.

THE word "priority" is now on everyone's lips—layman, industrialist and technician alike. It appears on every other page of the public and trade papers. But few outside of the industry itself know of its bearing—and its life or death meaning—to electroplating.

A shortage of several of the materials used in electroplating has already been reported. Part of this shortage is doubtless due to over-purchasing by fore-sighted users, but it is obvious that a real stringency is here, today. The degree to which electroplaters are concerned is best illustrated by the fact that at the liquidation of a plant in Philadelphia in March, 3000 lb. of nickel anodes were sold at auction for \$2.10 a lb. (against a standard value of 48c.). Scrap nickel is being held for \$1 to \$1.50 a lb.—a condition which recently called forth severe criticism from

Leon Henderson, Director of Price Stabilization for the Defense Commission.

At this writing nickel anodes are subject to priorities and nickel salts are becoming scarce. Cadmium anodes and cadmium oxide are both scarce. A shortage of chromic acid looms. Copper is relatively easy to obtain, but the Rochelle salts used in copper plating are already scarce. There is a shortage of zinc metal, but not yet a shortage of zinc salts. Tin metal, since there is no domestic supply, is sure to become scarce sooner or later, but the salts, upon which tin electroplating depends, are obtained locally from the stripping of tin plate, and are still reasonably plentiful. Naturally by the time this article appears in print these situations may change; accordingly the electroplater must at once consider the several substitutes and expedients that may soon become imperative.

The expedients possible include the following: (1) the use of scrap metal as anodes; (2) the use of insoluble anodes while the solution is fed from salts; (3) the substi-

tution of other metals, either wholly or in part.

Nickel

Probably the most important single type of plate is nickel, in tonnage of metal consumed, dollar value and effectiveness as a part of the product, for the following reasons:

(1) Consumer metal products cannot be sold without a decorative or protective finish, or both.

(2) In most cases the decorative finish must be protective as well, since most plating is done on steel which must be protected against rusting.

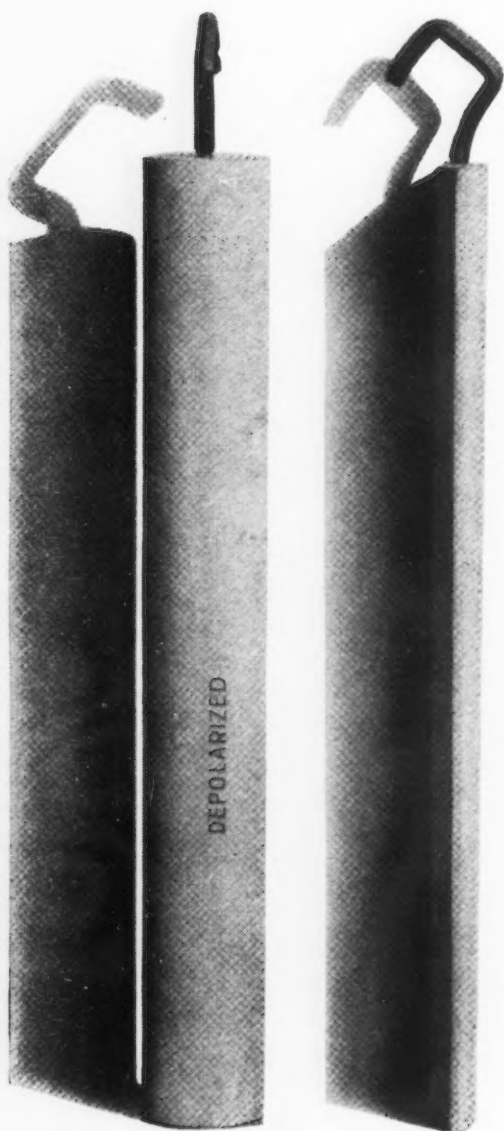
(3) In the combination protective and decorative finishes, nickel is the most important single element. Few, if any, commercial decorative plates are, single-handed, effective rust preventives. They are almost always applied over a substantial coating of nickel which provides the protection required.

(4) A large volume of industrial metal products, machine parts, chemical equipment, etc., call for a

heavy coat of nickel for resistance to corrosion and physical wear. Nickel is also used to an increasing extent for building up worn and mis-machined parts.

(5) Nickel plating is therefore an indispensable part of a huge volume of consumer and industrial metal products.

The present stringency in nickel was caused primarily by the demands of the Defense Program for nickel steel armor plate, and perhaps secondarily by over-purchasing on the part of some commercial users. According to some opinion, this shortage may be only temporary, and the supply in the long run, may be sufficient to take care of all normal demands, including those of the Defense Program. But even if this optimism is justified, the careful electroplater will use all possible methods of conservation, and will study each substitute suitable to his line.



The materials used in standard nickel plating include high purity cast nickel anodes, the so-called "depolarized" type (containing traces of nickel oxide) which may be either cast or rolled. The bath contains nickel sulphate, boric acid which serves as a buffer, and sometimes other salts such as nickel chloride or ammonium chloride. The nickel is very often deposited over an undercoat of copper.

Scrap Anodes

At this writing, metallic nickel in the form of anodes, either cast or rolled depolarized, is hard to obtain. The first measure that comes to mind, and the one that



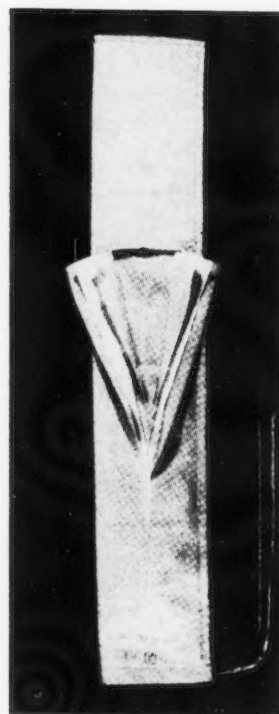
ABOVE

CORROSION of rolled depolarized nickel anode (99+ per cent) in nickel electrotype solution. From Nickel Solutions and Anodes, by George B. Hogaboom; Technical Bulletin No. 6, International Association of Electrotypers and Stereotypers, issued Feb. 28, 1941. Courtesy Hanson-Van Winkle-Munning Co.

o o o

LEFT

DEPOLARIZED nickel anodes, 99+ per cent. Courtesy Hanson - Van Winkle - Munning Co.



A NODE filter bag to keep impurities from the solution and conserve metal. Courtesy Hanson - Van Winkle-Munning Co.

o o o

involves the least alteration in shop routine is to use scrap metal instead of the usual anode. Scrap nickel, in the form of anode stumps and spines, strip, clippings, the skeletons left after stamping operations, or the like, is packed into a non-metallic basket, in close contact with a small anode. Rubber, porcelain, Bakelite or wooden baskets can be used but care must be taken to keep bits of metal from dropping out as they decrease in size.

The process goes on much as usual, except that greater care must be exercised if comparable quality is to be obtained. Thus, there may be occasional poor contacts; the metal serving as anode is likely to become coated over; this is accompanied by porosity in the deposit. The same difficulty in maintaining proper contact also causes current losses which increase the costs of operation.

Insoluble Anodes

The second of the expedients mentioned above is the use of insoluble anodes and increased quantities of nickel salts. The deposit is just the same as usual, but the

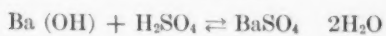
operation calls for considerably more care and expense. One plater has estimated that while nickel in the anode costs 46c. to 48c. per lb., the nickel fed from salts costs from 61c. to \$1 per lb. Reclaim rinses are recommended, as well as other precautions to avoid unnecessary drag-out and loss of chemicals.

Carbon, graphite or other anodes, insoluble in the acid nickel bath, may be employed. Carbon anodes are made of gas carbon, bonded with tar or the like, then baked. They tend to disintegrate under usage, especially in the presence of sulphates, and must therefore, be watched. Silver-lead¹ anodes have also been suggested, and another third type of anode is a copper-silicon lead-iron-tin alloy—its trade name is Chiles—that is insoluble in an acid bath. It is used in the copper refineries in Chile, and might be employed in nickel plating as well.

It must be remembered that chlorides in solution will attack any metal anode—even a platinum anode—dissolving it and releasing chlorine gas. Accordingly when working with any of the metallic anodes mentioned above, the plater must be sure that his bath contains no chlorides. Lead (even chemical lead) for example, would quickly go into solution and then deposit out with the nickel to give rough, dark, or spongy deposits.

(In electrolytic analyses, when chlorides are present, it is the custom to add some toluene to the solution to inhibit the attack of the liberated chlorine on the anode, which is usually platinum. The effect of this material on the nickel deposit in electroplating has not yet been investigated.)

When working with insoluble anodes, it is of course necessary to feed the solution often with nickel sulphate and at the same time to dispose of the accumulation of sulphuric acid that builds up in the bath. This is best done by adding barium hydroxide, which at the same time takes out the sulphate radical in the precipitate and neutralizes the acid:

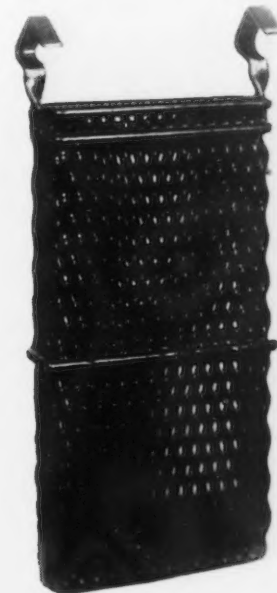
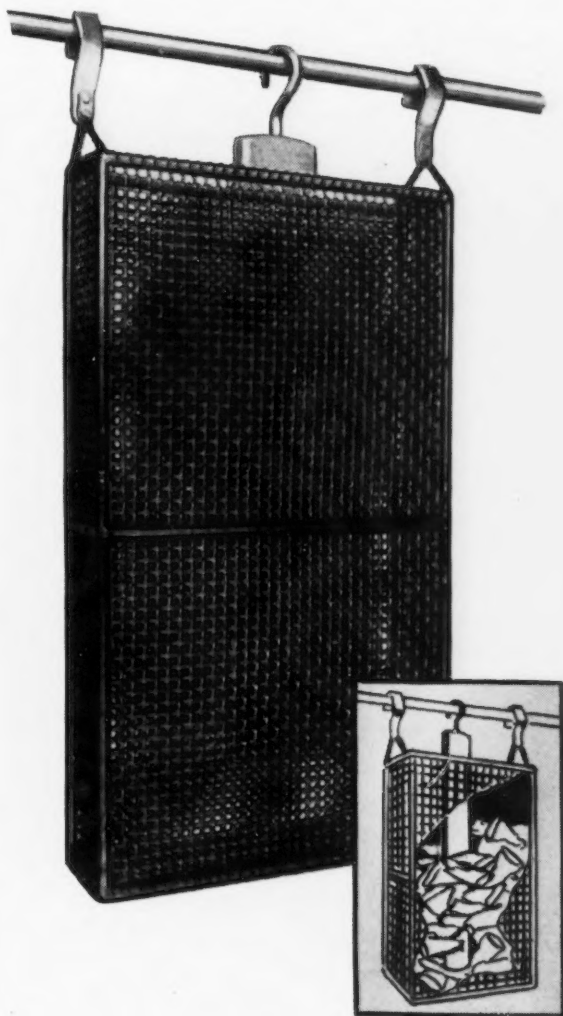


The barium sulphate precipitates as an extremely fine white powder which must be removed by filtering through a close-textured paper

—an operation that is difficult to perform even with good equipment. Calcium carbonate can be used instead of the barium hydroxide, but the resulting calcium sulphate is noticeably soluble. The carbon dioxide gas that forms during the reaction, some of which remains dissolved, must be removed by warming the solution, or brittle nickel deposits result.

The pH changes in the solution can be minimized by proper buffer-

native copper ore collects in the solutions used in copper refining, and is crystallized there, then purified and sold. Since the country expects the domestic supply of copper to be increased, it is hopeful that the supply of domestic nickel sulphate will be adequate. (At present it is not easy to obtain, perhaps because of over-purchasing by some consumers and perhaps because of the sudden increase in its use). Nickel chloride is gen-



ABOVE
RUBBER coated "anode scrap saver" or basket. Courtesy Automotive Rubber Co.

LEFT
SCRAP anode basket, showing method of use. Courtesy Belke Mfg. Co.

ing. Boric acid is generally employed for that purpose, but others may be more effective at pH's under 5 and between 5 and 6.5, according to Meyer². Satisfactory buffering permits the use of higher current densities and consequently, faster plating. Among the buffers suggested for pH's below 5 are acetic, formic, citric and hydrofluoric acids and their salts.

The nickel sulphate used in electroplating is of domestic origin, being obtained as a by-product in the electro-refining of crude copper. The nickel that contaminates

erally obtained as a by-product of the electrolytic deskinning of high-purity nickel anodes; consequently at a time when nickel anodes are not being made, this salt will be correspondingly scarce.

Nickel carbonate if available, is better than calcium carbonate for addition to a nickel sulphate bath, as it builds up the nickel supply, while at the same time the carbonate ion neutralizes the excess acid.

One recommended method of making such additions is as follows: remove about 50 gal. of the

¹ U. C. Tainton, U. S. Patent Nos. 1,759,493 and 1,851,219.

² Metal Finishing, April, 1941, p. 181.

solution from the tank; heat this 50-gal. lot to boiling and add 1 1/3 oz. NiCO_3 per gal. Make the addition very slowly. Adjust the pH to 6.8 and return the 50 gal. to the tank through a filter cloth.

Substituting Other Metals

Nickel plate of good quality is, as has already been stated often deposited on an undercoat of copper. The relative thickness of these two deposits can be varied; thus, if nickel is hard to get, a thicker copper underplate and a thinner nickel top coat can be used without sacrifice of corrosion protection. The thinner nickel plate will wear through in a shorter time (a heavier chrome will counteract this wear to a great extent) but when permanent good looks are not a primary consideration, this expedient is one of the first to occur. However, it involves a little extra expense in operation, and it is somewhat more troublesome to buff the heavier copper underplate.

Another word of caution is in order: buffing the nickel deposit should be reduced to a minimum to avoid waste of a "precious" commodity. Buffing can be applied to the basic metal and to the copper undercoat; then the nickel should be deposited bright, or simply touched up.

Silver Substitute for Nickel

If nickel and certain of the other base metals do in truth become so scarce as to be unobtainable for non-defense items, the manufacturer of metal products may well consider a silver plate instead. Silver is thought of as a "precious" metal, and it may shock some readers to see it mentioned here in this connection. However, it is much cheaper than it used to be—35c. per oz., and it is one of the few metals of which the U.S.A. has an oversupply. There is already huge supplies in vaults over the country, and (since silver is a by-product in the refining of copper, lead and gold, all of which are being mined at an accelerated pace) the domestic supply is likely to increase, rather than decrease.

The use of silver instead of nickel would add something to the cost of each article—a cost that in many cases will willingly be borne by the consumer. For a deposit of 0.0002 in. on brass—the cost of metal

would be about 1/2c. per sq. ft. for nickel and 5 1/2c. per sq. ft. for silver. Silver is beautiful, and it has a strong sales appeal. It tarnishes readily, but such formations can be delayed by the use of clear lacquer. Silver solutions are easy to handle and the old solutions can easily be treated for the recovery of waste metal.

Within recent months a most informative volume, entitled *Silver in Industry*³ has come out with Uncle Sam's benediction. The book contains the work of some 30 contributors, covering investigations carried out by the Silver Producers' Research Project, whose purpose was to stimulate interest in the many industrial possibilities of silver. Of immediate interest in view of the uncertainty of nickel and tin supplies is the information on the use of silver as a lining for containers.

Several methods of applying silver coatings are discussed in detail, including methods of electroplating silver in a form that is remarkably free of porosity. The use of silver plate on containers for food, beverages, cosmetics, pharmaceutical products and the like, is encouraged, since silver has high bactericidal powers. This suggests that its use on kitchenware of the cheaper kind, much of which is now nickel or tin plated, might well be attempted if the latter metals prove unobtainable. A glance at the many small articles sold in the 5c. and 10c. stores, many of them already silver plated and many others quite suitable for that finish, should prove to the reader that silver plate may be a promising answer to present problems.

Copper

A stringency in metallic copper for use as anodes has already appeared. Copper sulphate and copper cyanide are at this writing available, but certain other salts, notably Rochelle salts and sodium cyanide used in making up the alkaline copper bath, are already scarce. There is reason to believe however, that since copper is of domestic origin, there should be no permanent shortage.

There are two main types of copper solutions—the acid copper bath and the alkaline copper bath. The preferred anode in both procedures is rolled annealed copper. As in the case of nickel, the use of scrap copper for anodes is suggested when full-sized copper anodes

are not obtainable. Also, as in the case of nickel, it is possible, though not convenient, to work with an insoluble anode (Chilex, for example in acid sulphate solution and steel for alkaline solutions) and feed the bath wholly from salts.

This plan requires the exercise of close control over the composition of the bath. Thus in the case of the acid bath, the acidity of the solution increases as the metal content decreases and it is necessary to overcome this effect by the addition of copper oxide or copper carbonate, or by passing the spent solution over fine copper filings in the presence of oxygen.

In the case of the cyanide bath, as the metal content decreases the cyanide content increases and at the same time carbonate formation, as explained below, is hastened. The cyanide content is quite critical, as at high values the efficiency drops to a very low figure. For example the optimum free cyanide content of Rochelle copper solution is about 3/4 oz. per gal. as sodium cyanide. If a 100-gal. solution draws 100 amp., about 6.7 oz. of copper will be deposited per hour at 80 per cent efficiency. This will liberate 13.8 oz. of sodium cyanide or 0.14 oz. per gal. At the end of the day, allowing for losses by decomposition the free cyanide will be more than doubled.

Removal of excess cyanide is not simple. Addition of copper carbonate results in the liberation of the very poisonous cyanogen gas and an accumulation of carbonate which must eventually be removed. Boiling or holding at high temperature will decompose the cyanide but this procedure too, will result in an accumulation of carbonates. Eventually it will be necessary to discard the solution unless a refrigerating plant is installed to crystallize out excess carbonates at low temperatures.

Cadmium

Cadmium plating is carried on in an alkaline bath made up from sodium cyanide and cadmium oxide—and anodes of cadmium metal. At the present writing there is a great shortage of cadmium metal and cadmium oxide as well as the cyanide. How long this condition will remain is difficult to foresee, but immediate improvement is not in sight as cadmium is only a by-product of zinc production.

Cadmium plating can be carried

³ Edited by Lawrence Addicks, Director of the Silver Producers Research Project; the chapters on coatings by Addicks, A. J. Dornblatt, A. C. Simon, and A. M. Setapen.

out successfully with an insoluble anode—steel, for example—if cadmium oxide, cadmium hydroxide or cadmium cyanide is added in proper quantity. Fairly close control is necessary as the ratio of cadmium to cyanide must be maintained. Even when sufficient cadmium anode metal is available, there is a tendency for sodium carbonate to accumulate, and when an insoluble anode is used, this tendency is more pronounced. The carbonate comes from two sources: part is the result of the decomposition of

of refining capacity than to any shortage at the source. Zinc salts useful to the plater are still reasonably plentiful. If scrap, zinc, clippings, etc. are available, the first expedient to be used by the plater could be the substitution of scrap metal for anodes, packing it around a small metallic anode as described above in the section on nickel plating.

Zinc plating is carried out in two types of baths—the alkaline or zinc cyanide bath, and the acid or zinc sulphate bath. Normal procedure

line bath, and zinc oxide or zinc carbonate could be used to feed it. With the acid bath, a lead-silver anode is preferred, when zinc or scrap zinc is not obtainable. Excess acid tends to accumulate, and this can be reduced by the addition of zinc carbonate or zinc oxide, which at the same time builds up the zinc content.

All of these alternative methods are more expensive than the conventional practice.

C. W. Yerger points out that rapid progress is being made in



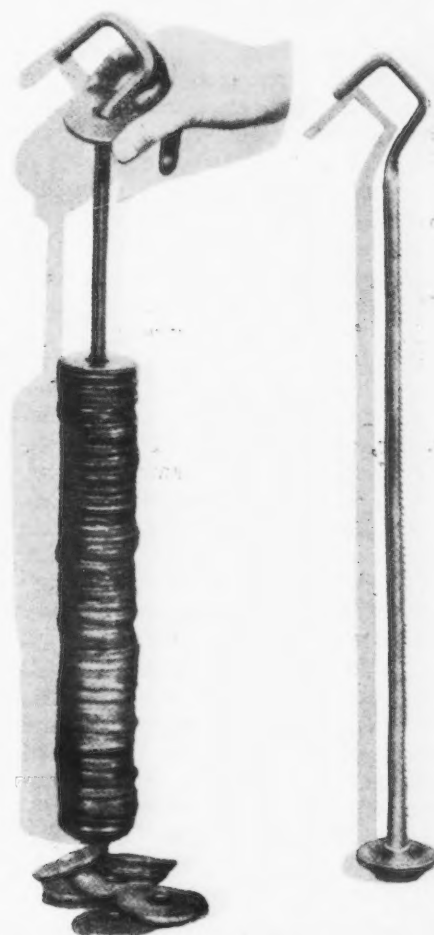
ABOVE

L LEFT - ROLLED copper disk anode (U. S. Patent No. 1,373,693); right—cast copper quoit anode (U. S. patent No. 1,373,693). Courtesy Hanson-Van Winkle-Munning Co.

° ° °

RIGHT

COPPER disk anode and lead spine for acid copper solution. Courtesy Hanson - Van Winkle-Munning Co.



the cyanide ion into carbonate and ammonia, and part is picked up from the carbon dioxide of the air. The decomposition of cyanide goes on at all times, being hastened by heat. The acquisition of carbon dioxide from the air is especially pronounced when working with an insoluble anode because this operation is accompanied by spattering and spraying of the solution due to liberation of oxygen gas at the anode, the spray coming in contact with the carbon dioxide of the air and carrying it back into the solution as a carbonate.

This building up of carbonate concentration is noticeable in all alkaline solutions. The excess carbonate may be removed in part by chilling the solution to about 35 deg. F., at which temperature the excess sodium carbonate crystallizes and can be filtered out. Another way is to add a specially prepared gypsum (U. S. patent No. 2,164,924) to throw down calcium carbonate, then filter. The latter method has the disadvantage of causing an accumulation of sodium sulphate in the bath.

Zinc Plating

There is at this time a shortage of zinc metal, due more to a lack

calls for anodes of zinc or zinc alloys containing mercury, aluminum, magnesium and calcium⁴. As in the case of other metals, it is possible to work with an insoluble anode and feed the bath by adding the zinc salts. With the alkaline bath there is the same accumulation of carbonates as noted above; there is considerable spraying at the anode, and carbon dioxide from the air is captured and converted into a carbonate, which can be removed as before, either by chilling or by the addition of gypsum. A steel anode could be used with the alka-

plating zinc from solutions prepared by leaching waste, zinc-containing materials such as salammoniac skimmings and other products of the hot galvanizing industry, as well as from the ore.⁵ This would obviously conserve metal and reduce the load on the zinc producing capacity of the country, as well as effecting savings in the plating operation.

Tin

The electrodeposition of tin is generally carried out with pure tin anodes, in an alkaline bath of which sodium stannate is the main con-

⁴ U. S. Patents Nos. 1,435,875; 1,451,543; 1,497,265; 1,887,841; 1,888,202; 1,064,307.

⁵ Steel, Jan. 6, 1941, "Zinc Plating Direct from the Ore or By-Products Will Decrease Load on Zinc Smelters."

stituent. Since there are no domestic tin sources, it is obvious that the present shortage of tin metal should not be expected to loosen up in the near future. As to the salts, sodium stannate is made locally, being obtained by stripping tin from tin plate. It is possible, in fact easy, to work with an insoluble (steel) anode, feeding the bath with sodium stannate. The usual accumulation of carbonate takes place, but as before, is removed by chilling or by the addition of gypsum. The caustic soda content also increases and is regulated by additions of acetic acid.

Tin is also electrodeposited from acid solution, tin sulphate being the principal constituent. As before, care must be taken to control the accumulation of acid, which is done by adding stannous oxide at intervals, at the same time building up the tin content.

Tin is usually classed with the base metals, but is far from cheap. It is not surprising, therefore, that silver is frequently suggested as a substitute for tin plate, particularly in connection with articles used with foods, beverages, pharmaceuticals, and cosmetics. Tin and silver have much the same appearance, and if the shortage of tin, with the almost inevitable price rise, should go on as expected, there is good reason to suggest that huge stores of silver in this country may be advantageously drawn upon.

C. W. Yerger, in the article already mentioned, advocates the use of electrolytic tin instead of the hot-dipped tin because the plated deposits are approximately one-third the weight of the hot-tin deposits. Also there is the possibility

of plating tin strip on one side only for certain tin can applications by placing sheets back to back, thus effecting even further savings.

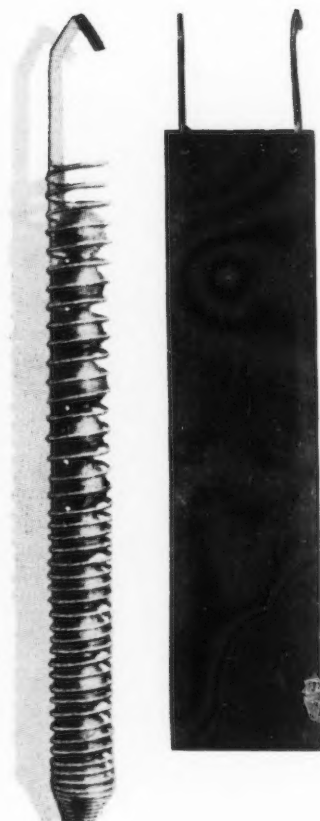
Chromium

Chromium is an important constituent in certain steel alloys necessary to defense. It is not surprising, therefore, that the supply of chromic acid should already have become restricted. The practice in chromium plating is to use an insoluble lead anode, and a bath whose main constituent is chromic acid. Accordingly, the expedients suitable for other electrodeposits are not available here. In other words, if the supply of chromic acid fails, the plater will simply have to stop chromium plating. Perhaps he will utilize some other finish—silver, or tin (if he can get it) or perhaps some of copper or brass finishes that were in vogue before chromium plating was perfected.

Economic Aspects

Although manufacturers of plated products would have been greatly inconvenienced, the greatest sufferers from a complete stoppage of plating supplies would have been the contract and jobbing platers.

The contract or jobbing electroplating industry is a service industry exclusively. The platers take metal products or parts made by their customers, apply a finish specified by the customer and return the parts. In this fashion, they not only serve those manufacturers who have no metal finishing departments of their own, but they also take care of the surplus or overflow from manufacturers who have



LEFT

B BALL anode and anode holder. Courtesy Hanson-Van Winkle-Munning Co.

RIGHT

C CARBON anode for nickel solution. Courtesy Hanson-Van Winkle-Munning Co.

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plating plants, but are unable to take care of their own output in the peak seasons.

The total value of work done by contract platers may be estimated at \$20,000,000 to \$25,000,000 per year. (See Census of Manufactures, 1939. Electroplating, Plating and Polishing.) The number of men employed in this industry is about 10,000. These figures are small, however, in comparison with the importance of the industry as a key operation in the manufacture of metal products. Exact statistics are not available, but it has been estimated that the contract electroplating industry directly or indirectly affects many times these figures in value of manufactured metal products.

Tight as it is, at this time, the writer has been authoritatively informed that the nickel anode situa-



A GRAPHIC representation of the advantages of ball anodes over the slab type. Courtesy the Udylite Corp.

tion may improve. At one time it seemed as though the supply of nickel for plating would be cut off, but at the present time, this does not seem necessary. (On the other hand, a well-informed factor in the industry believes that by June, nickel salts will be considerably freer for all plating purposes, but that nickel anodes will be hard to get for some time to come.).

At this time fantastically high prices for nickel salts are being asked by certain re-sellers, although the regular distributors of nickel anodes are selling nickel salts without interruption, at the same schedule of prices both for original packages and for less than original packages, that have been in effect for a number of years.

It is now said to be the intention of Washington to allocate enough nickel to plating to keep it operat-

* Acknowledgment is made by the author, of assistance in the preparation of his article, from C. M. Hoke and Nathaniel Hall.

ing, provided this can be done with about half its former requirements. Platers who can get along with a few hundred pounds per year may hope to obtain enough to keep them running if they can operate on less nickel than formerly. In view of the small amount of metal involved, a 25 per cent cut by the small users may be sufficient, although the hope is that ways may be found for them to use even less than 75 per cent if possible. Those whose requirements run into tonnage must reduce their consumption by much greater amounts to keep the whole field within the necessary limitations.

These allowances will, of course, cramp the plating industry to a certain extent, but it is obviously better than the original prospect of no metal at all. The industry will not have to shut down, but will find ways and means, by its own ingenuity, of turning out its work even though the supply of nickel is restricted.

Those dealing with this situation in the Office of Production Management are practical men with experience in making a production job go. They are working hard to be fair to all concerned and they know that manufacturers, warehouses, and platers must work together in order to keep this industry on its feet while the Defense Program goes forward with the necessary speed.

Conclusion

Shortage alone need not stop plating; methods can be found; but costs will be higher, and the consumer in 1941 must be satisfied with thinner plates; possibly with finishes quite different from what they have been using.³

Meanwhile panic buying and hoarding should not be countenanced. If the Defense Program really requires the metals, the electroplater will do with less, but will still manage to serve his customer if given only half a chance.

Production of Chromium-Molybdenum-Aluminum Steel

A METHOD of producing chromium-molybdenum-aluminum steel in basic electric furnaces utilizing the works' own scrap containing 0.35 to 0.42 C, 1.4 Cr, 0.3 to 0.5 Mo and 1.0 Al, was described by V. Goldman in *Stal*, 1940, No. 1, according to a translation by the Iron and Steel Institute (British).

Preliminary experiments in which the scrap was first melted in an acid electric furnace and then mixed with a charge in a basic electric furnace, proved unsuccessful. In the method developed, the scrap was mixed with 30 per cent of low-carbon iron or mild steel and melted down in a basic electric furnace, no lime being added. A fluid slag comprising 1.5 to 2.0 per cent of the melt was formed by oxidation of the constituents of the charge and by some attack on the refractory lining; this slag contained lime 10 to 35 per cent, silica 15 to 39 per cent, magnesia 9 to 29 per cent, alumina 25 to 42 per cent, ferrous oxide 1.5 to 7 per cent, manganous oxide 3 to 12 per cent and chromic oxide 2 to 7 per cent.

The composition of the metal after melting was: Carbon 0.30 to 0.40 per cent, manganese 0.20 to 0.35 per cent, chromium 0.80 to 1.10 per cent, molybdenum 0.25 to 0.40 per cent, aluminum 0.15 to 0.30 per cent and silicon 0.05 to 0.25 per cent. The slag was removed, but a little was left to protect the metal, and deoxidation was affected by adding either coke or, better still, charcoal and lime mixed with small amounts of ferrosilicon.

The refining slags contained lime 48 to 65 per cent, silica 12 to 26 per cent, magnesia 10 to 30 per cent, alumina 3 to 15 per cent, ferrous oxide 0.3 to 1.2 per cent, manganous oxide 0.12 to 0.42 per cent, and chromic oxide 0 to 0.8 per cent. The alumina content favored rapid deoxidation of the refining slag. The necessary amounts of ferrochromium and ferromolybdenum were added at the beginning of the refining period. The steel was tapped into a ladle to which the required amount of aluminum had been added.

The results of the examination of the microstructure and of me-

chanical tests are discussed; these results were very uniform and in some cases the steel obtained from charges which included the works own scrap was superior to that obtained from charges with no scrap, and it satisfied the technical specifications. In subsequent experimental heats it was shown that the self-forming slag (*i.e.*, slag formed without the addition of fluxing agents) could be used for refining and deoxidizing purposes. By eliminating the need for forming a second refining slag, the time for re-melting was shortened by 1 hr., or 16 per cent.

In conclusion, the results of microscopical examinations of the cast and of the rolled steel are discussed. The number of non-metallic inclusions in the steel refined under a second slag was about the same as in that refined under a self-forming slag, but sulphide inclusions predominated in the latter. In the rolled steel the distribution and shape of the non-metallic inclusions caused less ferrite banding in the steel produced with works scrap in the charge than in that for which no scrap was used.

Superfinish Improved

A MORE exact control of the various specific factors that determine quality of surface finish, mechanically produced, has marked recent improvements in production of surface smoothness. This has included the adoption of controllable and adjustable hydraulic pressure on abrasive stones in place of spring pressure or posi-

tive cam pressure, studies of effects of varying the pressures during the operation, especially in the final stages, and studies of the path or pattern which the abrasive elements should take on the surface to produce optimum results. Attention has been focused on the temperatures produced on the surface by the abrasive; also, the linear

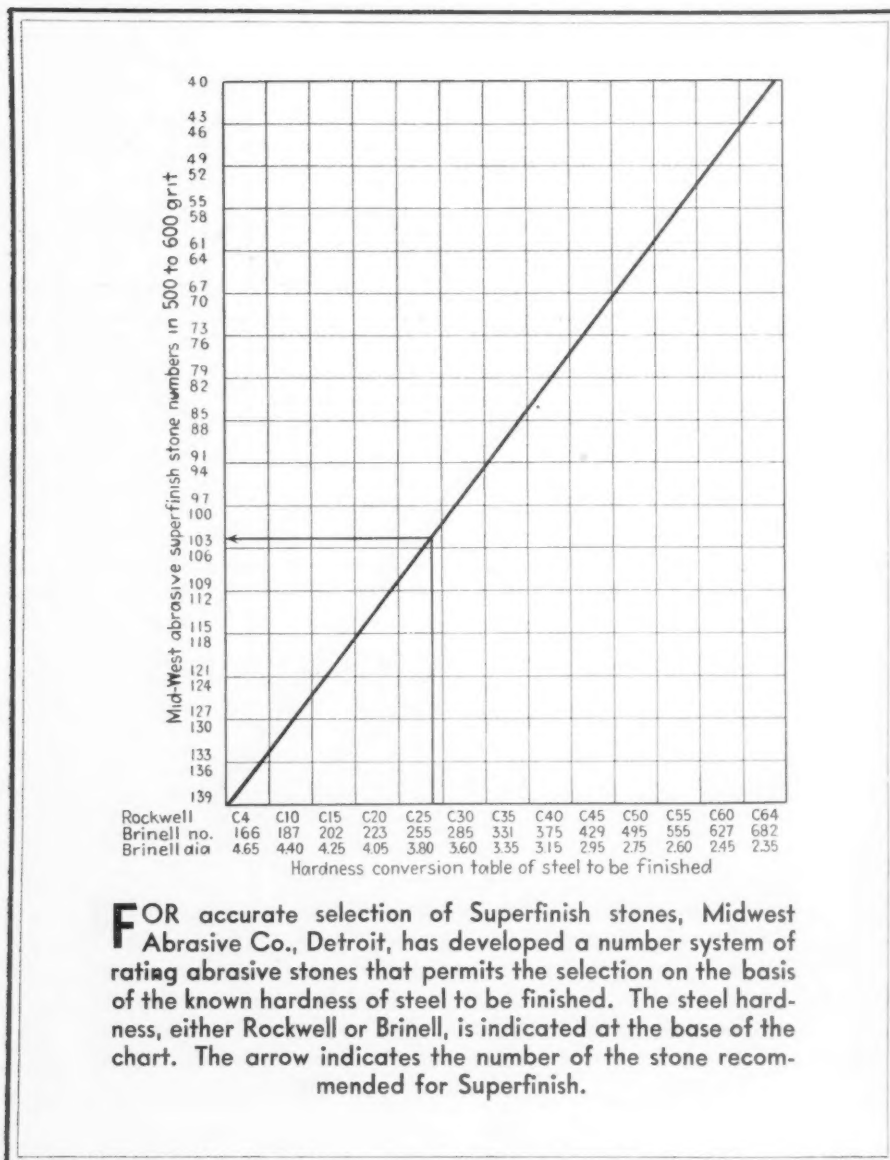
speed of abrasive grits on the metal surface has been called important. Stone grading by means of hardness tests has become widely accepted since its publication as a method by E. L. Hemingway in "Testing Bond Hardness of Abrasives" (THE IRON AGE, April 25, 1940).

Developments in the direction of assuring constant bond characteristics of the abrasive elements and increasing production of Superfinished parts are claimed now by Midwest Abrasive Co., Detroit.

In practice, some stones, supposedly identical, have been found to vary tremendously as to grain structure and cutting qualities, even though superficial examination and hardness tests have indicated similarity. From the user's viewpoint, it has been difficult to judge exactly what a stone would accomplish. The situation was similar to going in to buy a pair of shoes, and discovering that sizes were not "as marked." The only resource would be to guess and hope that a fit could be found.

In other words, experience has shown that Rockwell or Brinell hardness can be misleading when the grain structure is not exactly uniform. Lack of uniformity in the past has caused time losses in trying stones, setting up machines, in actual operation and in inspection of finished parts. In addition to possible rejection of parts because of inaccuracies in the stones, manufacturers have found that costs mounted because of the number of stone "throw-aways" in many cases.

According to Midwest engineering data, a considerable part of the lack of uniformity was attributable to adhesion between grits; this effected a change from the apparent or measured hardness and also was the equivalent of lack of uniformity in grit size. Adherence of several



by Abrasive Uniformity

By W. F. SHERMAN
Detroit Editor, *THE IRON AGE*

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grits together produced one large grain which, especially upon tearing away from the bond, would cut faster and deeper than an individual grit. This was responsible for scratching the finished part and also contributed in some cases to a too-rapid wearing away of the stone itself.

These conditions were especially apparent in attempts to produce metal "flats," for instance those sometimes used as oil seals. If the stone was "hard" enough to retain the grits firmly, thus reducing wear to a minimum and offering extra assurance that the stone would stay flat, the tendency to "load up" and stop polishing became great. On the other hand, users found that if the bond fracture rate was speeded up to make the stone self-cleaning, the uneven tearing away of grits spoiled the flatness of the stone. Either condition meant more care and higher costs, with frequent dressing of the stone required.

The solution offered by Midwest makes use of a grit "neutralizing" treatment to insure that each grit of abrasive is isolated and prevented from adhering to adjoining grits. It is said that the treated grits in the unbonded state are of high capillarity, and that in every case the bonding agent is finer than the material bonded, so complete coating of each grit of abrasive is obtained. This bonding formula is referred to as micro-bond.

On the flat seals already mentioned, a surface finish of 1 to 2 micro-inches (r.m.s.) is being obtained by Superfinish in 15 sec. contact time from an 18-20 micro-inch ground finish. Formerly, these flat seals were ground, lapped with cast iron laps, and finally finished with India oil on surgical stones.

On typical automotive jobs and on some specialized aircraft parts such as valve guides, production rates have been increased notably

because of a faster uniform cutting rate, fewer stone dressings and less interruption of work for changing stones. In addition, the absence of excessive "tearing away" and wear has greatly increased stone life and the amount of production obtainable from one set of stones. The following table, representing an automotive application on tappet barrels shows economies which have been effected.

That stone replacement can be a

adopted a new method of rating stones. It is based, first of all, on bond hardness and, secondly, on the stone density. More correctly, this second factor is related to the controlled pressure used in manufacturing the stones. This provides the user with a means for selecting Superfinish stones, incorporating both a specific hardness and whatever stone density is required for a particular application. Thus, for a steel of known hardness, a suitable Superfinished stone can be selected (see illustration). Because of accurate control in the stone manufacture, the desired combination of bond hardness and stone density can be obtained.

	Optimum Stone	Average Stone
Cost to each stone	25¢ each	19¢ each
Cost for 12 stones	\$3.00	\$2.28
Pieces per dressing	1165	1044
Minutes to dress 12 stones	¾ min.	¾ min.
Cost per dressing	3¢	3¢
No. of dressings, stone average	22	14
Dressing cost per 12 stones (full life)	66¢	42¢
Minutes to change one stone	2 min.	2 min.
Cost to change one stone	8¢, 2 men	8¢, 2 men
Replacing cost for 12 stones	\$1.60, 2 men	\$1.92, 2 men
Pieces produced per 12 stones	27,634	14,628
Total stone cost plus dressing and changing	\$5.26	\$4.62
Stone cost per piece	.019¢	.031¢
Micro-inch reading average	4.2	4.9

considerable factor in determining production and cost is indicated by figures from a motor company, which now is producing 2500 crankshafts per set of stones, compared with 300 to 400 with stones formerly used. In another instance hardened steel sleeves for a tractor engine are being finished with stones that produce up to 185 liners per set of stones, compared with 37 liners per set averaged in the past.

Following adoption of new methods to control accurately the quality of abrasive stones, Midwest has

Tool Angles for Steel Cutting with Carbide—Erratum

IN the article which appeared in the March 20 issue under the above title, by Harry S. Wilcox, the title of the table printed on the bottom of p. 40 was in error. The test data apply to power consumption in cutting SAE 1035 steel, instead of SAE 1015 as indicated. The cutting speeds tabulated are nominal cutting speeds (lathe dial settings), for which calibration curves are given on pp. 42 and 43.

Ultrasonics—A New M

THE announcement that the first American ultrasonic generators are now commercially available is not only of considerable interest to theorists but may also prompt some very interesting experimental work. This technique may not be quite ready for immediate application; however, some of the results achieved and some of the currently feasible projects which are of interest to the metal industry are here described.

Ultrasonic waves are those vibrations which lie above 17,000 cycles per sec. or 17 kc., the upper limit of human hearing, and in their shorter reaches merge with radio and finally light waves. The best known applications today are the inaudible dog-whistle and the submarine detector.

Intensive sound waves have strong mechanical, thermal and electrical effects. Particularly strong local concentrations of energy occur by the formation of vacua in liquids. This is called cavitation. L. A. Chambers (*J. Chem. Phys.* 5, 1937, p. 290) was able to obtain luminescence in liquids due to cavitation, using sound waves of 9 kc. frequency of extreme strength. With ultrasonic waves, considerably denser energy concentrations can be achieved. H. Frenzel and H. Schultes (*Z. Phys. Chem., Abt. B.*, 27, 1934, p. 421-4) found luminescence in water "sounded" with ultrasonic waves of less strength at 500 kc.

The production of ultrasonic waves has developed a lot since Koenig produced waves up to a frequency of 90 kc. in 1899 using a small tuning fork. The Galton whistle followed, which produced undulations up to 100 kc. and when gas and later hydrogen were applied still higher frequencies were reached (up to 500 kc.). Modern producers of ultrasonics are, broadly speaking, of two types: the magnetostriction producer and the piezoelectric machine. Magnetostriction is the property of ferromagnetic materials to expand or

By C. M. COSMAN
The Iron Age, New York

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contract under action of a magnetic force. If such a rod is placed in an alternating magnetic field, it experiences a series of oscillations which can be used as a source of ultrasonic waves. Langevin used such an arrangement when he devised the submarine detector in the last war.

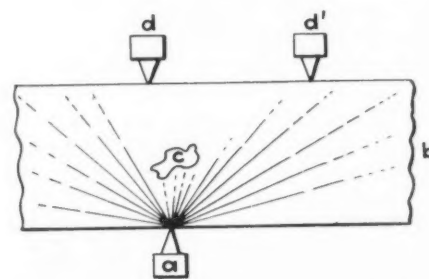
Piezoelectricity, discovered by the Brothers Curie in 1880, is the property of some crystals to undergo dimensional changes under the influence of a magnetic field. These are very small, but can be seen clearly under the microscope or through the optical lever, and are due to changes in the free electric charges of the crystal lattice. Since here again frequency variations of the current will correspond to mechanical reflexes in the material, a means is available to send out ultrasonic waves.

Modern applications of ultrasonic rays are varied and increasing in number. But the methods employed are often kept intentionally obscure by "inventors" who propose mysterious "rays" for a variety of biological processes. With some slight experimentation they have been able to select a suitable frequency for ripening and fermentation processes and sell them for often exorbitant royalties.

As far as the metal working industry is concerned, some very good work has been done, so far mainly by Germany, France and Russia. Little is known of practical applications of these methods, but the experimental results are startling and seem most promising.

The propagation of waves depends on media. When waves encounter an impermeable object they leave a "shadow." This will be clearer and more defined, the smaller the wave length in relation to the obstruction.

The permeability of metals for sound and ultrasound is great. However, fine cracks or impurities will obstruct the passage of these waves: sound absorption and reflection will take place. Only the shorter ultrasonics give an indication of the position of faults. O. Mülhåuser was the first to propose the use of ultrasonics as a testing method. (D. R. Patent No. 569,598, 1931.) The drawing is self-explanatory; a = ultrasound generator, b = test piece, c = cavity, d = receiver (no waves), and d' = receiver (waves recorded). In the application of this idea, the contacting of the test piece with sound generator and receiver has



USE of ultrasonics as a testing method, as proposed by Muelhæuser; a is the ultrasound generator, b is the test piece, c is the cavity, d is the receiver (no waves), and d' is a receiver (wave recorded).

been a great difficulty. When that can be overcome, Mülhåuser's idea will probably find wide application as a "pre X-ray" test, the X-ray being necessary only if a fault is encountered with ultrasonics. S. Solokoff (*Phys. Z.* 36, 1935, p. 142) describes an instrument for the testing of materials which is based upon Debye and Sears' discovery (*Proc. Nat. Acad. Amer. Wash.* 18, 1932, p. 440) of diffraction gratings in "sounded" water. Solokoff's apparatus is arranged in such a fashion that a clouded picture of a diffraction grating on a photographic plate will indicate a fault in the tested material. Newton Gaines (*Physics*, 3, 1929, p. 209)

Metallurgical Tool

emphasizes the possibility of using strong mechanical waves (sound, ultrasound) as a means of fatigue testing. Within one hour a sound frequency of 10 kc. will cause 36,000,000 reversals. The values obtained in experiments are in good agreement, according to the author.

Since the effect of ultrasonic waves is similar to heavy mechanical stresses, the crystal structure of materials under "sound" will experience percussion or shock. H. E. Hollmann and W. Bauch (Naturwiss. 23, 1935, p. 35) have found a loosening of the crystal structure of ferro-magnetic material after exposure to ultrasonics.

Antimony and cadmium, which usually solidify with a coarse grain structure, can be obtained in a fine grain state by "sounding," according to L. Schmidt and L. Ehret (Z. Electrochem., 1937, 43, p. 869). Antimony is less brittle, while the hardness increases from 34 to 52 kg. per sq. mm. The time needed for solidification is not reduced, but undercooling is eliminated. Similar is the behavior of Duralumin and silumin. G. Malhoux (C. R. Acad.

—This technique, not yet much beyond the theoretical stage, may be a means of testing metal, degassing liquid metal, speeding up hardening operations, etc.

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Sci. Paris, 191, 1930) treated steel with ultrasonic waves and high frequency at elevated temperatures and—although the experimental conditions are not quite clear in his report—the results he claims are remarkable. When a 0.35 C, 3 per cent Ni and Cr, 1 Mo, 15-mm. steel bar was exposed to NH_3 at 500 deg. C. for 9 hr. under the influence of waves, the hardness was improved from 380 Brinell (Vickers) to 1033 with a depth of penetration of 0.35 mm. The control experiment did not show an increase in hardness and the depth of penetration was 0.01 mm. Malhoux concludes that wave treatment raises the speed of penetration of nitrogen and improves the case and hardness. Subjecting chromium-plated

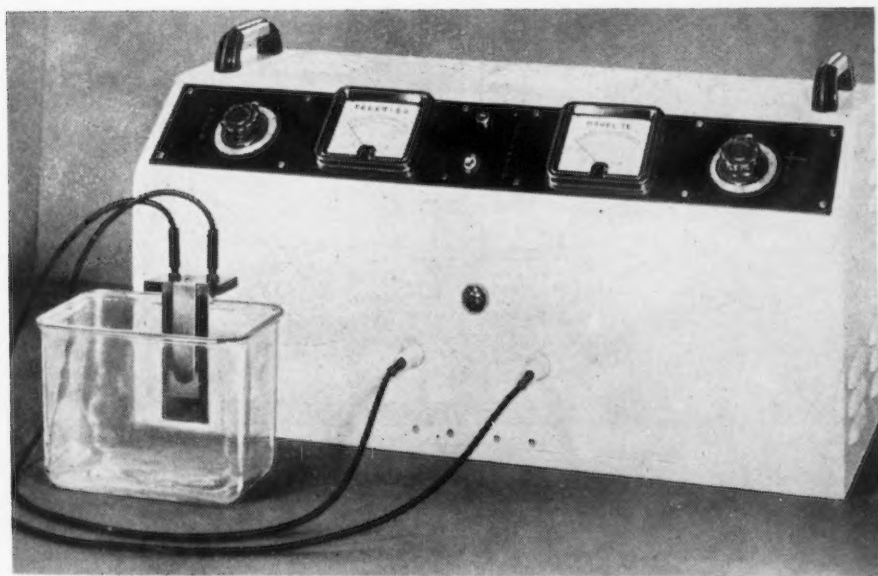
steel at 530 deg. C. to oscillations for 9 hr., a depth of penetration of 0.35 mm. was noted—no penetration took place without agitation.

Also, O. Meyer, W. Eilender, W. Schmidt (Arc. Eisenhüttenw. 6, 1933, p. 241-5) tried high frequency currents on nitriding steels with considerable success. But, as they find that increased time will not improve depth of penetration, the conclusion that mechanical agitation will favor nitration seems justified.

More recently S. Solokoff (Acta Physicochemica U.S.S.R. 3, 1935, p. 930) found in investigating the action of strong ultrasonics of 80 watts at frequencies between 600 and 4500 kc. on metallic melts, that "sounded" casts solidified more rapidly. In tests with zinc the structure was more dendritic, indicative of a more rapid solidification.

The investigations of Wood, Loomis, Claus and other workers have shown that a very fine dispersion of materials can be obtained by the use of ultrasonic waves. These metallic dispersions can be produced in emulsions and powders. This is important for electrolytic and precipitation processes.

The whole technique of alloying may undergo changes with the application of ultrasonics. G. Masing and G. Ritzau (Z. Metallk. 28, 1936, p. 293) have been successful in alloying aluminum with lead. Schmidt and Ehret, *ibid.*, also dispersed lead in aluminum, and cadmium in silumin, at a sound frequency at 10 kc. Seemann (Metallwirtsch. 15, 1936, p. 1067) discusses the possibility of forming mixed crystals with ultrasonics in



S SMALL ultrasonic generator produced by Televiso Products, Inc., Chicago. This is said to be the first such generator produced commercially in the United States.

cases where there is limited solubility.

The property of cavitation will be especially useful with metallic melts to effect degassing. Small gas bubbles will tend to the points of minimum agitation, the nodes of the ultrasound waves. There they can unite to form larger bubbles which have a sufficient size to rise to the surface of the liquid metal. (R. W. Boyle and G. B. Taylor, *Transac. Roy. Soc. Can.* 20, 1926, p. 245.) Patents have been submitted in Germany and Austria which ad-

vocate the degassing of melts by the use of ultrasonics. These are also extended to high frequency agitation.

Not only finest distribution but also the agglomeration of finest particles (similar to degassing mechanically) can be achieved with ultrasonic waves. Fogs and dust can be precipitated—this application will be interesting to industrial plants.

Industry is only at the threshold of developments which may make ultrasonic waves a most important

piece of production equipment. The first firm to place at the disposal of the American market complete equipment for the production of these waves is the Televiso Products, Inc., 2400 North Sheffield Boulevard, Chicago. This firm produces at reasonable cost a range of apparatus for the production of ultrasonic waves. Illustrated herein is the smallest model (56). This generates ultrasonic energy at a rate of 80 watts at 400 kc. The largest model produces 1600 watts of ultrasonic waves.

Center of Gravity Determination—Made Easy

HITHERTO, the method of determining the center of gravity in machines, castings or other units has been based upon calculation. This method is a hit-or-miss process at best and designers have long been concerned about its inaccuracy.

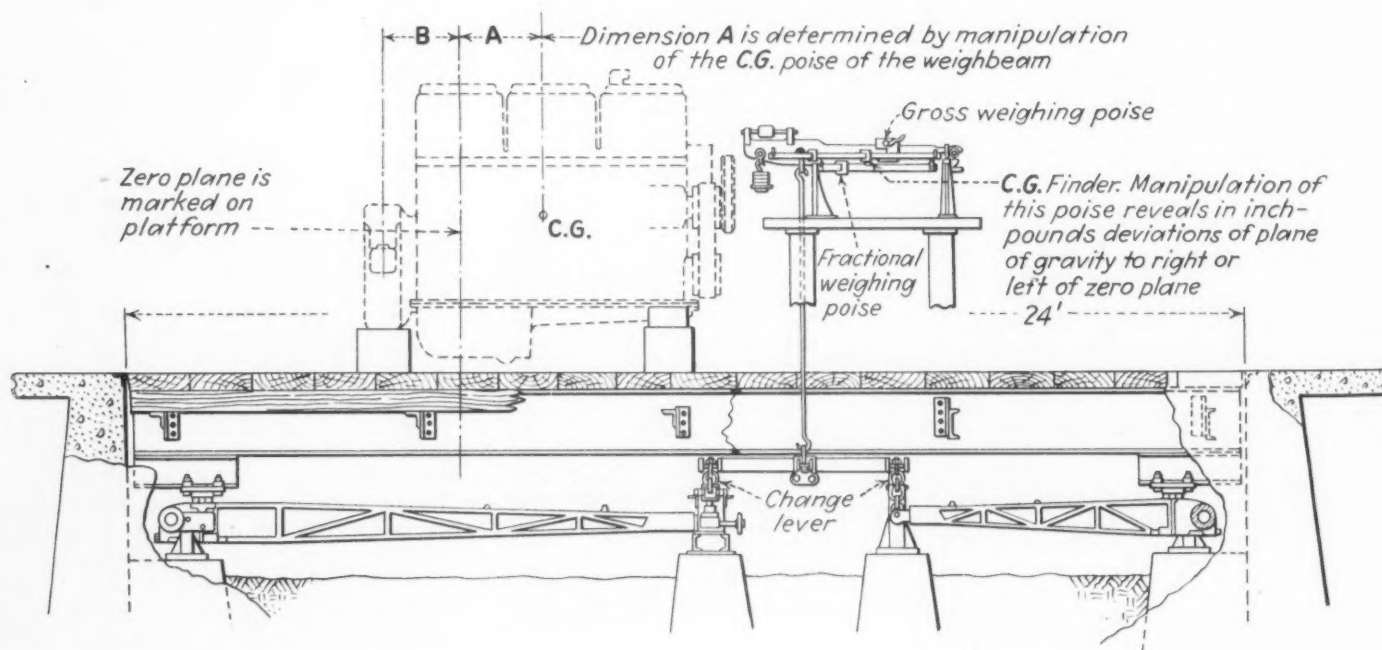
The difficulty of determining the precise location of the center of gravity in a casting is obvious. The calculation is dependent upon certain assumptions: the homogeneity, the trueness of the casting and the theoretical weight of the material. Any or all of these assumptions may be in error.

A new development brought out by the Soweigh Scale Co., Delavan,

Ill., is aimed at supplying equipment accurate within minute limits for locating the center of gravity. The machine can be offered for any capacity from 500 lb. to 100 tons. Platform sizes will extend from 4 ft. sq. up to a size large enough to handle bombing planes.

The accompanying illustration shows a moderate size of unit capable of handling objects up to approximately 20 tons. The illustration discloses an unconventional scale lever system including two levers each having two fulcrum points. One of the fulcrum points in each of these will function when an object is being weighed and the other functions when actual center

of gravity determination is being made. The initial conditioning of the unit is a simple process requiring but a short time. Also after the initial conditioning the weighing of an object and the determination of the gravitational center is a very brief process. Weight is read as usual in pounds and center of gravity reading is given in inch-pounds. Inch-pounds divided by the true weight yields in inches a result which locates the center of gravity with reference to a known point on the object. Each reading yields a result which locates a plane of gravity. A series of three readings is required for location of center of gravity.



Heat-Treating Machine Tool Parts

GENERAL view of the Cincinnati Shaper Company's new heat treating department, showing the five-speed Harnischfeger hoist on Cleveland Mono-rail type bridge and runway. Equipment on the left includes Lindberg draw furnace for operations requiring temperature range of 200 to 1250 deg., gas heated alkali tank for washing cutting oil from machined parts and quenching oil from quenched parts; oil quench tank; Leeds & Northrup carburizing and hardening furnace; slow cooler; and Micromax controls and recorders (left). This new equipment is housed in a specially designed new building.



UNDER the hood, which extends the full length of the back wall, there are a Waltz cyanide pot furnace shown, an interchangeable lead and salt pot furnace of similar appearance and a Waltz salt draw furnace, the last two not shown. Both pot furnaces are equipped with manifold pressure gages and butterfly type valves controlled by conveniently located push and pull buttons. Water quench and oil tanks are between the two furnaces. A feature of the water quench tank is that a high pressure air line is connected to the bottom so that air can be bubbled up through the water so as to give a mottled effect on cyanided parts. The pot furnaces and salt draw unit are gas fired, temperatures being controlled by L & N Micromax recording indicators.



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WALTZ car bottom type gas fired furnace used for annealing, normalizing, special heat treatments to get machinability, and for pack carburizing of parts too large to be handled in the electric furnace. Parts shown on the car include machine parts burned from 6 in. steel plate. All of these parts have had a special heat treatment to obtain better grain structure, machinability, and to relieve strains.



Transformers Simplified by New Steel

NEWEST offspring of industrial research is Hipersil, an improved magnetic material which, used in transformer cores, has one-third greater flux-carrying capacity than the best conventional silicon steel. In carrying this increased flux it requires no more magnetizing force and its losses will be no greater. Furthermore, its magnetostriction, or sound-producing property, is reduced so that increased magnetic flux causes no increase in sound level. In its first application it has reduced size and weight of distribution transformers as much as 25 per cent; has facilitated reduction of copper losses some 10 per cent and thereby increased short-time overload capacity. Voltage regulation is also improved. The material is the result of a joint research program conducted by Westinghouse and American Rolling Mill Co. over the past nine years.

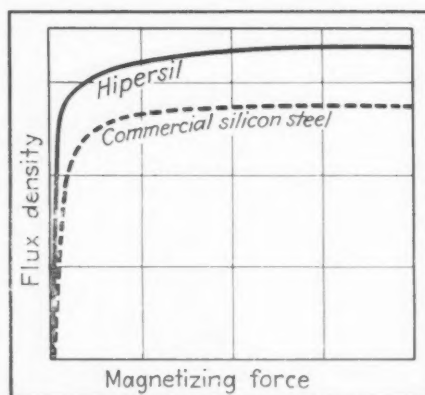
A crystal of any magnetic steel is cubical in form; is easily magnetized along its edges, less easily along its diagonal. If these molecules could be packed face to face like toy building blocks in a tray, the material would be easily magnetized in any one of three directions. Such a steel would be perfectly "grain orientated." Ordinary silicon steel has little or no grain orientation, but the special process of producing Hipersil results in orientation in one direction (that of rolling); hence the material is easily magnetized in this direction, but used at right angles to the grain it is much less effective than the older material. Silicon content is about the same in either type of steel.

The methods of attaining this result are described in U. S. Patent 2,158,065 assigned to the American Rolling Mill Co. Material has a silicon content of 2.90 to 3.30 per cent and a carbon content of 0.02 per cent or under, with low manganese and low sulphur. In fact, since the carbon content is important

NINE years of effort and an expenditure of almost \$2,000,000 went into a joint research effort on the part of Armco and Westinghouse to produce a new type of silicon steel that has exceptional magnetic properties in the direction of rolling. It is probably the biggest advance in magnetic material since silicon steel was developed 35 years ago. All manufacturing processes are being changed at Westinghouse's Sharon works to utilize the new material for transformers.

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from the standpoint of minimum core loss, with the heat treating technique used, carbon is finally reduced to 0.008 per cent or less. Ingots are first rolled to slabs then heated to around 2000 deg. F. and hot rolled to $\frac{3}{8}$ in. in thickness on a universal mill and then finally reduced to about 0.105 in. through tandem mills, finishing the material at a temperature of about 1500 deg. F. Then follows an initial heat



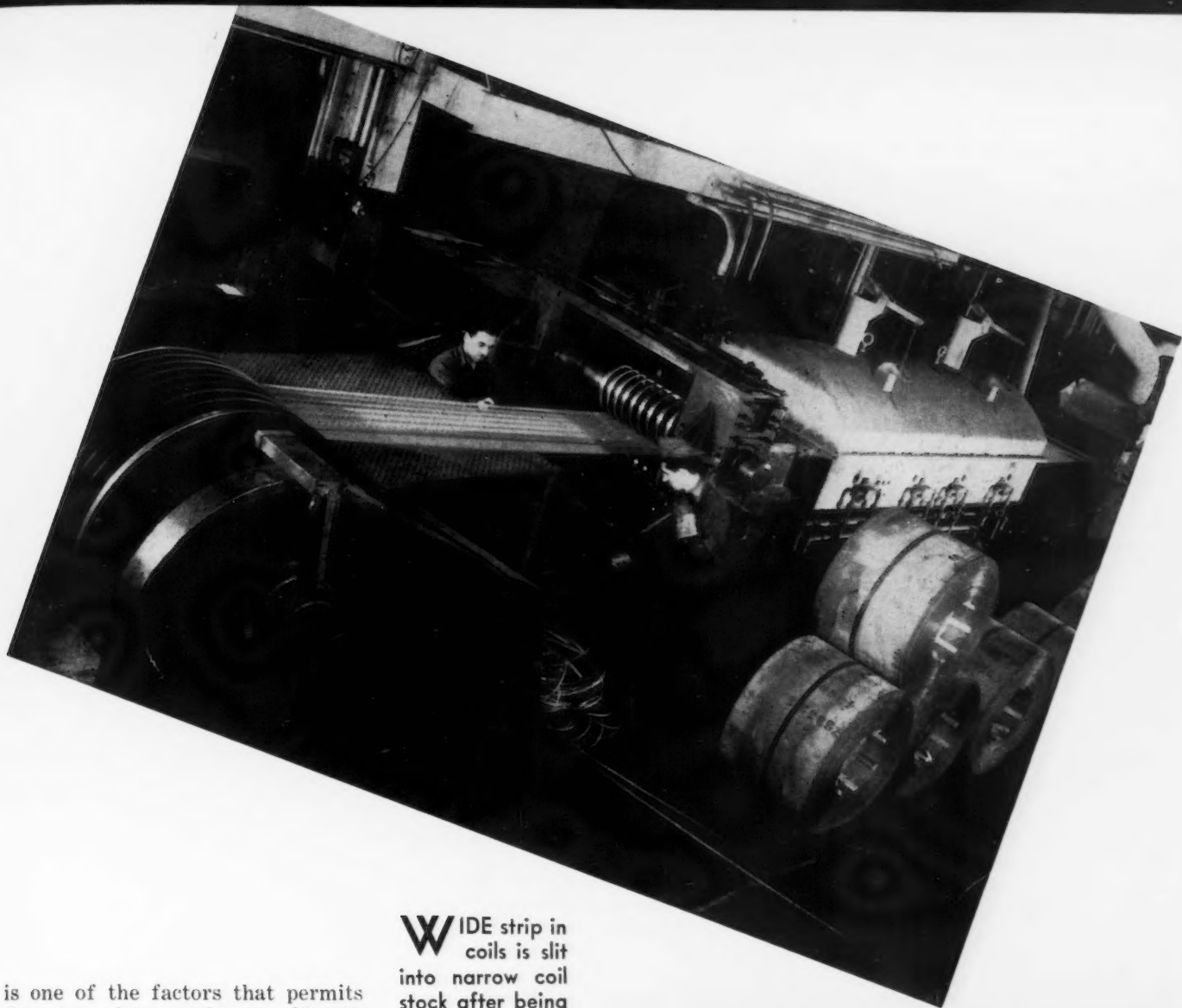
HYPERSIL, a new grain oriented magnetic steel, works at a higher flux density than ordinary silicon steel because the knee of the saturation curve is about a third higher.

treatment consisting of box annealing the stock in coil form at 1400 deg. F. for 24 to 36 hr. after which it may be cooled slowly, as desired. Pickling follows.

The next step is to give the material a drastic cold reduction. This is one of the critical points in the process if the desired crystal lattice orientation is to be obtained. Cold reduction between anneals must never be less than 40 per cent and preferably around 70 per cent, say from 0.105 to 0.029 in. gage. It is essential, however, that the material never be allowed to rise in temperature above the boiling point of water. Where the material is rolled in a tandem mill, artificial cooling means must be used between passes, or if the strip is rolled in a single mill, coils must be run through in series so as to allow cooling off periods, thus preventing heat accumulating from pass to pass. Four to six passes are used in the first stage of cold reduction, following which the coils are open annealed at 1850 deg. F., slit if desired and pickled. Then the second step in cold reduction is performed, this time in six to ten passes, with the total reduction not quite so drastic, bringing the final thickness down to 0.013 or 0.014 in.—in the order of about 60 per cent reduction.

The final step is a heat treatment, without an intervening pickle. This is preferably a flat anneal, done in boxes with a high purity hydrogen atmosphere. The strip is cut up into sheets, which are coated with magnesium oxide as a separator. Annealing time is 60 hr. at 2200 deg. Carbon reduction can be obtained at this point by preceding the hydrogen anneal by a scaling anneal.

The cold rolling treatment is particularly critical in forming the desired crystal orientation. Keeping the temperature of the strip low during cold reduction is vital if best results are to be secured. It



is one of the factors that permits departure from ordinary cold rolling orientation.* The reason is that it is possible to secure much more perfect selective orientation if the process of crystal twinning is caused to go on in the material.

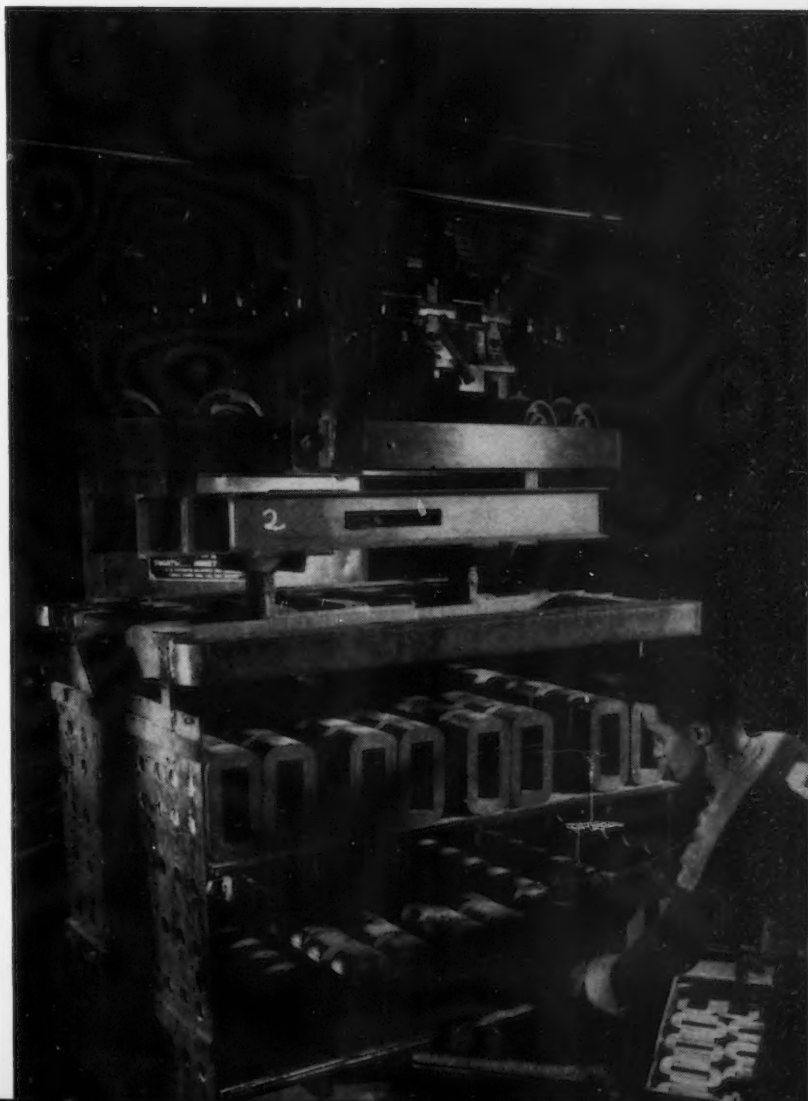
In twinning, the orientation is changed, since one may imagine the operation as being one in which a crystal is cut in half along the twin plane and one half of the crystal is rotated on the plane 180 deg. or less with respect to the other half. Twinning occurs generally so that slip planes of a crystal are at a more favorable angle than those already functioning. The phenomenon is observed by X-ray diffraction and has been observed in Armco ingot iron when the crystals are subjected to hammer blows at room temperature. Furthermore when alpha iron changes to gamma iron as the temperature passes through

* In which, according to Miller's indices, a (110) direction of the crystals is parallel to the direction of rolling and a (100) face of crystals is parallel to a face of the sheet. The object of the special treatment is to produce silicon steel sheets which are oriented so that the (100) directions of substantially all crystals are parallel to a face of the sheet, and to each other, since maximum permeability lies in this (100) direction, that is, in planes parallel to faces of crystal lattices.

WIDE strip in coils is slit into narrow coil stock after being passed through the gas fired tempering furnace seen to the rear of the slitter.

o o o

AFTER annealing in electric bell furnaces, wound steel cores are impregnated with a plastic bonding material to make them solid. Cores on racks like this pass through an evacuating chamber; then the bonding material is introduced under pressure to force it between the closely wound metal laminations.



the transformation range, twins are formed in the new grains of gamma.

Thus in a two step process, in the first reduction there will be not only the ordinary cold rolling orientation, but also a degree of crystal twinning will be initiated in the strip. Upon the subsequent intervening annealing, this twinned condition will increase in extent and upon the final cold rolling and ultimate heat treatment, substantially all of the crystals will have assumed the preferred orientation by passing through a twinned stage. This essential twinning will not occur if the temperature during rolling rises about 212 deg. Superior magnetic properties are attained only by careful control and elimination of process variations which most operating men would consider minor. The annealing between cold rolling is not critical as to temperature but is primarily employed to bring the stock back in condition for further drastic cold work and to cause the twinned nuclei to grow by accretion.

Under a magnetizing force a piece of steel elongates minutely then contracts when the flux collapses, the amount depending upon the strength of the magnetic field. With an alternating flux, as in a transformer, this dimensional change takes place twice each cycle, thereby resulting in transformer hum. Known technically as magnetostriction, this cyclic dimensional change in Hipersil is less than in ordinary silicon steel at the same flux density. Even at the higher densities at which the new steel is utilized in transformers, magnetostriction is at most no

greater, so transformer noise will not be increased as a result of greater flux density in the core.

Because Hipersil can be worked at higher induction than ordinary silicon steels, the size and weight of transformer cores can be reduced; consequently, fewer turns of copper are needed, and the average length of turn is diminished. Besides, the assembly can be placed in a smaller tank. For distribution transformers weight reduction is from 20 to 25 per cent.

This new magnetic material is now being used by Westinghouse in some but not all of its transformers up to 200 kva. size. Because of the fact that the magnetic flux carrying properties are improved only in the direction of rolling, the usual method of stacking L-shaped stampings to form a transformer core has had to be abandoned in favor of a method of winding the steel around a form.

The steel reaches Westinghouse in the form of coil stock, grain oriented and coated with a thin transparent glass film. The purpose of this coating is twofold: It acts as a rust preventive and as an insulating material between layers to minimize eddy current losses. First operation in the manufacture of the cores is to slit the yard wide coil stock into narrow strips. This is done by roll slitters after the stock first passes through a gas-fired tempering oven to reduce the brittleness of silicon steel. The narrow stock is then fed into semi-automatic winding machines which wrap the strip continuously about a rectangular block to form a core like an elongated doughnut of rectangular cross-section. When

the core has reached the right thickness a limit switch stops the winder, the strip is sheared and the free end spot welded to the pack.

These formed cores are then annealed in electrically heated bell type furnaces to relieve winding strains and then are loaded in conveyor carrying racks for running through a special process tunnel. Here they receive several treatments, including the injection of a thermoplastic resin bonding material between the metal layers. The bond makes each core a solid piece so that the layers of steel will not unravel when they are cut in two for insertion of the transformer coil. Before the assembly, the ends of the U-shaped core pieces are surface ground to assure a tight magnetic circuit when the pieces are reassembled. The two parts are held together with ordinary steel strapping such as is used in crating. The whole transformer assembly is then given a protective coating of shellac in the conventional manner.

Hipersil transformers can be manufactured 10 to 20 per cent faster than the transformers they replace, since it is no longer necessary to deal with a large number of small pieces in assembly. Inasmuch as the same transformer capacity can be obtained with much less material, Westinghouse engineers estimate that when Hipersil is used in all sizes and types of transformers, savings of copper and silicon steel will amount to 5000 tons a year. On a pound-for-pound basis, however, Hipersil costs about twice as much as ordinary hot rolled silicon steel.



A TOTAL of 588 man-hours went into the making of this Meehanite stone crusher bed. Seventy-five tons of Meehanite were melted and poured simultaneously from two ladles of 30 and 35 tons capacity each, with a third 10-ton ladle completing the pouring. Casting was poured in 10 min., but was left in sand for two weeks to properly cool. Another week was required to shakeout and clean. Bed was made by Farrel-Birmingham Co., Inc., Ansonia, Conn., for use by Kingston Trap Rock Co., Kingston, N. J. Choice of Meehanite for casting this unusual job was said to be due to fact that it provided a balance between performance, adaptability to machining requirements and production costs.

1500 TOOL STEELS

By T. W. LIPPERT
Technical Editor,
The Iron Age

IF the metal working industry could be thought of as having a heart, tool making would undoubtedly be that important organ. And, selection of the proper tool steel is the most difficult task faced by the tool maker, a task that is today additionally complicated by scarcity of certain alloy steels and by new and severe tasks in armament production.

There are today offered in America many, many hundreds of different brands of tool, metal cutting and die steels, produced and distributed by scores of different concerns. Each day many requests come to THE IRON AGE for the name of the maker of a certain trade-marked steel, and these requests have generally been beyond the scope of a directory of trade marks published by THE IRON AGE over a decade ago, and frequently also beyond several even more complete directories published elsewhere.

Believing that now there is a particular need for such a directory, what with many new users of tool steels searching for proper alloys and with more experienced users searching for substitutes, THE IRON AGE has gone to the 104 American producers, importers and distributors of tool, metal cutting and die steels, asking them for their alloys, trade names and characteristics. The names of the firms handling these steels will be appended to this directory.

In some cases these are duplications, which duplications have been included when the same steel is handled by several companies. Occasionally, the same steel has been indexed several different ways. In certain instances steels no longer made are included in order to make the directory complete, and the same applies to imported steels no longer available to users in this country. And, of course, there are innumerable instances of almost identical steels made by different companies under different trade names, yet frequently these different brands are not completely interchangeable. Thus, the approximate 1500 different brands listed herein constitute the most complete indexing of these important steels now available.

One field having 1500 trade-marked steels is certainly in need of some form of classification and standardization. Such action is now being taken by a committee of representatives of leading engineering societies as well as governmental bureaus, under the sponsorship of the American Society of Tool Engineers (project B-52). However, this action will require some time, and for many years

yet an index such as here presented should find widespread application.

There are many different schemes for classifying tool steels. Most useful to the average user, however, should be a list of competitive tool steel brands made by principal producers in this country. This listing follows:

REGULAR CARBON TOOL STEEL. Pompton, Talon, XCL, Standard (Braeburn), Comet, Latrobe, Standard (Columbia), Black Diamond, Sanderson, Crescent, Standard (Halcomb), Standard (Cyclops), Standard (Disston), Sterling, Chippaway, Standard (Latrobe), Carbon Tool, Green Label, Fort Pitt.

EXTRA CARBON TOOL STEEL: Pompton Extra, Stag, XX, Extra (Braeburn), Extra (Carpenter), Extra (Columbia), Sanderson, Crescent, Park, Howe Brown, Peerless, Extra Warranted, Extra (Cyclops), Extra (Disston), Extra (Firth Sterling), Lion Utilities, Extra (Latrobe), Carbon Tool Extra, Blue Label, Extra (Vulcan).

SPECIAL CARBON TOOL STEEL: Pompton Special, Class E, XXX, Special (Braeburn), Special (Carpenter), Special Colhead, Special (Columbia), Sanderson, Crescent, Park, Howe Brown, Special (Halcomb), Special (Cyclops), Best, Best ASV, Washington, Special (Latrobe), Carbon Tool Special, Red Label, Special (Vulcan).

18-4-1 HIGH SPEED: LXX, Imperial Special, Bethlehem Special, Vinco, Star Zenith, Red Cut Superior, Clarite, Rex AA, Dreadnought, B-6, Kut Kwik, Blue Chip, Supremus, Electrite No. 1, Two Star, Red Streak, Wolfram.

18-4-2 HIGH SPEED: ML, Imperial Extra Special, H-V, Twin Van, EVM, Vanite, Rex Supervan, Super Dreadnought 18-4-2, B-9, Blue Chip HV, Supremus Extra, Electrite 19, Super HS Steel, Lockport Special.

COBALT HIGH SPEED: Panther Special, Super Panther, Imperial Major, Comocut, Cobalt Bonded Carbide, Gold Star, Coco, Red Cut Cobalt, Gray Cut, Maxite, Rex AAA, Rex 95, 999, B-7, B-8, D-6-Co, Circle C, Co Major, Purple Label, Electrite Cobalt, Three Star, Super Cobalt, Wolfram Cobalt, Baltoc.

MOLYBDENUM HIGH SPEED: LMW, DBL, Mo-Cut, Mo-Max, Carpenter Moly, Ven Lom., Molyte, Rex T-Mo, VM, Mo-Tung, Super Mo-Tung, Blue Chip, HM, Kromol, Mogul, Tatmo, High Speed, Molybdenum Extra, Vul-Mo, Super Mo-Chip, Star Max, Di-Mol, S.T.M.

HIGH CARBON, HIGH CHROME: Ontario, Huron, Double Six, Super Die, Lehigh, Superior, Hampden No. 610, Ohio Die, Crocer, Superdie, HyCC, Airdie, Marathon, Haldi, Ultra Die No. 1 and 2, Croloy, Cromovan, 3-C, OSN, Diamond, Hi Pro.

OIL HARDENING, NON-DEFORMING: Deward, Utica, Saratoga, K-9, Tool Room, Kiski, Stentor, Colonial No. 6, Vasco, Non-Shrinkable, Oil Die, Uni-Die, Paragon, Champion Non-Changeable, Ketos, Wando, Mansil, Invaro, Truform, Mangano, Constant, Non-Shrinking Teemox, Non-Shrinkable.

TUNGSTEN HOT WORK: Atlas A and B, Mohawk Hot Die, No. 5 Hot Work, No. 57, T Alloy, T-K, DYO, No. 3, Marvel, Durite, Peerless A, B, C, and D, LCT, K-L, M and R, Ajax W, B-4, LT, 2-B, Hot Work W, E.H.W., Midvaly, Nut Piercer, Calo Ferro.

CHROME HOT WORK: EB Alloy, No. 4 Hot Work, No. 445, Hot Die No. 2, No. 35, Choice, Phoenix, Crescent, Hot Work No. 2, LaBelle 89, Pyro, Ajax Cr, CYW, JJ, Chrome, Hot Die, Regular Bolt Die, No. 4 HW, No. 6 HW.

SHOCK RESISTING CHISEL AND PUNCH: Seminole, 602, 609, Minerva, Omega, Tough No. 71, Vibro, SM, Solar, Excello, Silman, Parex, Buster, Pneu, LaBelle, Silicon, 2-70, CSM, Alco, Keystone, D-29, JS, Chimo, Zip Zip, X-L, Special Punch, Duredge Chisel, No. 4870, Blue Edge.

A

A-B-C

A special alloy steel, containing W and Cr. Darwin & Milner, Inc., Cleveland.

Achorn Best Carbon

Water hardening steel. Contains C 1.10, Mn 0.20. Achorn Steel Co., Boston.

Achorn Cold Heading

Water hardening steel. Contains C 0.95, Mn 0.30. Achorn Steel Co., Boston.

Achorn Extra Blade

Oil hardening steel. Contains C 1.10, Mn 0.25. Achorn Steel Co., Boston.

Achorn Extra Carbon

Water hardening steel. Contains C 1.05, Mn 0.25. Achorn Steel Co., Boston.

Achorn Extra Solid Drill

Water hardening steel. Contains C 1.15, Mn 0.30. Achorn Steel Co., Boston.

Achorn High Production

Air or oil hardening steel. Contains C 1.60, Cr 12.00, Mn 0.80, V 0.20. Achorn Steel Co., Boston.

Achorn High Speed

Standard 18-4-1 and 18-4-2 analyses. Achorn Steel Co., Boston.

Achorn Hollow Drill

Water hardening steel. Contains C 0.75, Mn 0.30. Achorn Steel Co., Boston.

Achorn Silver Die

Water hardening steel. Contains C 1.00, Mn 0.25. Achorn Steel Co., Boston.

Achorn Solid Drill

Water hardening steel. Contains C 0.85, Mn 0.35. Achorn Steel Co., Boston.

Achorn Special Alloy Die

Oil hardening steel. Contains C 0.50, Cr 0.90, Mn 0.25, W 1.25, Mo 0.20. Achorn Steel Co., Boston.

Achorn Standard Carbon

Water hardening steel. Contains C 0.95, Mn 0.30. Achorn Steel Co., Boston.

Achorn Superior

Non-deforming, oil hardening steel. Contains C 1.00, Cr 0.40, Mn 1.00, W 0.40. Achorn Steel Co., Boston.

Acorn Brand No. 1

A plain carbon steel. Swedish Iron & Steel Corp., New York.

Acorn Brand No. 2

A plain carbon steel. Swedish Iron & Steel Corp., New York.

Acorn Standard No. 3

A plain carbon steel. Swedish Iron & Steel Corp., New York.

A. C. T.

High speed, oil hardening steel, for heavy duty tools. Contains C 0.65, Cr 4.50, Mn 0.15, Co 0.10, V 2.00, W 18.00, Mo 0.75, Si 0.15. Atlantic Steel Co., New York.

A-41

A special alloy steel. Vulcan Crucible Steel Co., Aliquippa, Pa.

Airdi 110

A high carbon, high chrome steel for axle burnishing tools, blanking dies, broaches, burnishing rolls, clay pulverizing blades, cold extrusion dies, etc. Contains C 1.10, Cr 12.00, V 0.25, Mo 1.00. Crucible Steel Co. of America, New York.

Airdi 150

A high carbon, high chrome steel for axle burnishing tools, blanking dies, broaches, burnishing rolls, clay pulverizing blades, cold extrusion dies, etc. Contains C 1.50, Cr 12.00, V 0.25, Mo 0.80. Crucible Steel Co. of America, New York.

Airdi 225

A high carbon, high chrome steel for axle burnishing tools, blanking dies, broaches, burnishing rolls, clay pulverizing blades, cold extrusion dies, etc. Contains C 2.25, Cr 12.00, V 0.25, Mo 1.00. Crucible Steel Co. of America, New York.

Air Hardening

A special alloy steel, containing Cr. H. Boker & Co., Inc., New York.

Air Hardening

A special alloy steel. Halcomb Steel Co., Syracuse, N. Y.

Air Hardening

Steel used for turning tools. Contains C 1.80, Cr 4.00, Mn 0.35, Mo

4.10, Si 0.65. Hawkrigge Bros. Co., Boston.

Airkool

Air hardening tool steel, for blanking, trimming, forming dies, gages, tap master tools. Contains C 0.95, Cr 5.25, V 0.50, Mo 1.15. Crucible Steel Co. of America, New York.

Airkool

An air-hardening steel, for blanking dies and gages. Machines and files well. Low distortion. Excellent wear. Contains C 0.90, Cr 5.00, V 0.40 to 0.50, Mo 1.75. Hawkrigge Bros. Co., Boston.

Airloy

Manganese-moly, air hardening die steel. Excellent non-deforming quality. Better toughness and resistance to wear than manganese oil hardening types. Contains C 1.00, Cr 1.00, Mn 3.00, Mo 1.00. Allegheny Ludlum Steel Corp., Watervliet, N. Y.; also Edgecomb Steel Co., Philadelphia.

Airomat 33

Air hardening, non-tempering steel, for blacksmith tools, rivet sets, pneumatic tools, star drills, cold chisels, punches. Contains C 0.33, Cr 2.50, Mn 0.75, Mo 1.00, Si 0.75, Cu 0.50. Atlantic Steel Co., New York.

Airque

Air hardening, non-deforming steel for dies, containing C 1.25-1.35, Cr 5.00-5.50, Mn 0.45-0.60, V 0.20-0.40, Mo 1.10-1.35, Si 0.80-1.10. Braeburn Alloy Steel Corp., Braeburn, Pa.

Airtem

Air hardening steel for dies, punches, tools, etc. Has high resistance to wear, is tough and fatigue resistant. Contains C 1.30, Cr 5.25, Mn 0.50, V 0.30, Mo 1.25, Si 1.00. Lehigh Steel Co., New York.

Airvan

Non-deforming, air or oil hardening die steel, for blanking and forming dies. Contains C 0.95, Cr 4.00, Mn 0.50, V 0.40, Mo 1.00. Firth-Sterling Steel Co., McKeesport, Pa.

Ajax

Water hardening steel for dowel pins, shafts, taps, etc. Contains C 1.05, Mn 0.50, Si 0.20. Kidd Drawn Steel Co., Aliquippa, Pa.

Ajax Cr

A chrome hot work steel. Universal-Cyclops Steel Co., Bridgeville, Pa.

Ajax No. 2

Chrome hot work steel, for hot work dies, gripper and header types, etc. Resistance to heat checking. Contains C 0.95, Cr 4.25, Mn 0.30, V 0.50, Mo 0.45, Si 0.30. Universal-Cyclops Steel Co., Bridgeville, Pa.

Ajax W

A tungsten hot work steel. Universal-Cyclops Steel Co., Bridgeville, Pa.

Albany

A special alloy steel, containing Cr and V. Allegheny Ludlum Steel Corp., Pittsburgh.

Albion Special

A high speed steel. Hobson, Houghton & Co., Inc., New York.

Albor White Label

A water hardening, shock resisting steel, for jewelers' dies, striking and cold stamping dies, containing C 0.80-

0.85, Cr 0.65-0.75, Mo 0.20-0.25. Wm. Jessop & Sons, Inc., New York.

Alco

Chisel steel, for punches, chisels, rivet sets, etc. Very tough and resistant to fatigue. Contains C 0.45, Cr 1.50, Mn 0.25, V 0.25, W 2.25, Si 0.25. Universal-Cyclops Steel Co., Bridgeville, Pa.

Aldivan

Oil hardening die steel, for die casting dies for zinc and white metals. Contains C 0.45, Cr 2.50, Mn 0.65, V 0.25. Latrobe Electric Steel Co., Latrobe, Pa.

Alloy

A special alloy steel. Driver-Harris Co., Harrison, N. J.

Alloy B

A special alloy steel. William Jessop & Sons, Inc., New York.

Alloy C

An oil or air hardening, tough and wear resisting steel, for cold impact extrusion and blanking dies, shear blades, gages, pressure hobs, wire drawing dies, spinning tools, etc., containing C 1.90-2.00, Cr 13.00. Wm. Jessop & Sons, Inc., New York.

Alloy Finishing

A special alloy steel, containing W. Braeburn Alloy Steel Corp., Braeburn, Pa.

Alloy No. 6

A special alloy steel, containing Cr. The Midvale Co., Philadelphia.

Alva Extra Tool

Alloy tool steel, for mining tools, pneumatic rivet sets, punches, reamers, shear blades, stone tools, taps, threading dies, etc. Contains C 0.75 to 1.20, V 0.25. Crucible Steel Co. of America, New York.

Alva Special

Alloy tool steel, for beading tools, blanking dies, calking tools, chisels, edge tools, flue rollers, forming dies, hammers, etc. Contains C 0.75 to 1.20, V 0.25. Crucible Steel Co. of America, New York.

AMC

A general purpose high speed steel of 18-4-1 type, for lathe tools, shaper and planer tools, milling cutters, boring tools, reamers, etc. Contains Cr 4.00, V 1.30, W 18.00. A. Milne & Co., New York.

AMCOH

An oil hardening tool steel, for blanking, forming extrusion and stamping dies, etc. Contains C 0.85 to 0.90, Cr 0.40 to 0.60, Mn 1.00 to 1.75, W 0.70. A. Milne & Co., New York.

Amotun

High speed steel, for bolt and threading dies, chasers, counter sinks and bores, hot cutters, hot forming dies, machine taps, rifling tools. Contains C 0.85, Cr 4.00, Co 6.00, V 1.75, W 1.50, Mo 8.00. Atlantic Steel Co., New York.

Anchor Cold Drawn Shapes

Special alloy and plain carbon steels. Anchor Drawn Steel Co., Latrobe, Pa.

Anchor Specialties

Special alloy and plain carbon steels. Anchor Drawn Steel Co., Latrobe, Pa.

Anchor-Tite

Cemented tungsten carbide (WC) for cutting tools and dies. Made by Tungsten-Widia Tool Corp., New York, now out of business.

Andard

A plain carbon steel. Duke Steel Co., Inc., New York.

Annite Tool

Wear resisting steel for general production purposes. Contains C 1.50, Cr 0.10, Co 1.00, Mo 1.00. Bissett Steel Co., Cleveland.

Anvil

A plain carbon steel, containing Mn. Boyd-Wagner Co., Chicago.

AO20

A chisel steel of 2.00 to 2.50 tungsten type, for cutting hard materials, such as type used for billet chipping. Contains C 0.45 to 0.50, Cr 1.25 to 1.75, V 0.20 to 0.30, W 2.00 to 2.50. A. Milne & Co., New York.

Apex Drill Rods

Water hardening steel for taps, punches, drills, reamers. Has good hardness and is tough. Contains C 0.90, Mn 0.30, Si 0.20. Lehigh Steel Co., New York.

Ark Brands

A special alloy steel. William Jessop & Sons, Inc., New York.

Armstrong High Speed

A high speed steel. Armstrong Brothers Tool Co., Chicago.

Armstrong Self-Hardening

A high speed steel. Armstrong Bros. Tool Co., Chicago.

Arrow

A non-deforming steel, containing Mn and W. Boyd-Wagner Co., Chicago.

Arrow

A special alloy steel, containing Cr and V. Latrobe Electric Co., Latrobe, Pa.

Arrow

A non-deforming steel, containing Cr, W and V. Peninsular Steel Co., Detroit.

Arrow Brand

A high speed steel. John A. Crowley Co., New York.

Arrow Oil Hardening

A non-deforming steel. K. Engsted, New York.

Artidie

Die steel for jewelers' and silverware dies. Great depth and center hardness. Contains C 0.95, Cr 0.30, Mn 0.25, V 0.02, Si 0.25. Columbia Tool Steel Co., Chicago Heights, Ill.

A.S.V.

Water hardening steel, for pistons, dies, etc. Is a center-free steel of broad adaptability. Contains carbon as required, Mn 0.25, Si 0.20. Firth-Sterling Steel Co., McKeesport, Pa.

Atha Chrome Roll

Alloy tool steel, for rolls and drawing dies. Contains C 0.90, Cr 1.35. Crucible Steel Co. of America, New York.

Atha Pneu

Alloy tool steel, for backing-out punches, battering tools, beading tools,

boiler makers' tools, calking tools, cold sets, shear blades, etc. Contains C 0.45, Cr 1.25, V 0.25, W 2.75. Crucible Steel Co. of America, New York.

Atha Rim Roll

Alloy tool steel, for rolls and drawing dies. Contains C 1.00, Cr 0.50. Crucible Steel Co. of America, New York.

Atlan

An oil hardening, non-deforming die steel, for complicated dies and tools of intricate section. Blanking dies, broaches, gages, reamers, taps, cutting, drawing and forming dies. Contains C 0.90, Cr 0.50, Mn 1.15, W 0.50. Atlantic Steel Co., New York.

Atlan HCC

High carbon, high chromium die steel, for blanking dies, circular cutters, mandrels, master tools, rolling dies, plug and ring gages. Contains C 1.50, Mo 12.00, V 1.00, Mo 0.80. Atlantic Steel Co., New York.

Atlantic

Air or oil hardening steel, for finishing work and intermittent cuts. Contains C 0.50, Cr 4.00, Mn 0.20, V 1.00, W 18.00, Mo 0.15, Si 0.20. Atlantic Steel Co., New York.

Atlantic C

High speed, oil hardening steel, for shaping tools, cutters, etc. Contains C 0.65, Cr 4.00, Mn 0.15, Co 4.00, W 18.00, Mo 1.00, Si 0.15. Atlantic Steel Co., New York.

Atlantic Die

Oil hardening, non-deforming steel, for punches, dies, shears. Contains C 0.70, Cr 1.00, Ni 1.60, Mn 0.40, Si 0.25. Atlantic Steel Co., New York.

Atlantic 33

A non-tempering, water hardening steel, for cold chisels, punches, blacksmith tools, rivet sets, pneumatic tools, high temperature resisting bars for all hot work, star drills. Contains C 0.33, Cr 0.75, Mn 0.40, Mo 0.75, Si 0.65, Cu 0.75. Atlantic Steel Co., New York.

Atlantic 33 C

A non-tempering, water hardening steel, for high temperature resisting bars, blacksmith tools, pneumatic tools, rivet sets. Contains C 0.33, Cr 0.75, Mn 0.40, Co 0.50, Mo 0.75, Si 0.65, Cu 0.75. Atlantic Steel Co., New York.

Atlantic 44

A non-tempering, oil hardening steel, for dies, shear blades, rivet sets, pneumatic tools, etc. Contains C 0.44, Cr 0.75, Mn 0.40, Mo 0.75, Si 0.65, Cu 0.75. Atlantic Steel Co., New York.

Atlantic V

High speed steel, for reamers, form tools, roll turning tools, lathe tools, broaches. Contains C 0.80, Cr 4.25, Mn 0.30, V 2.00, W 18.5, Mo 0.65, Si 0.35. Atlantic Steel Co., New York.

Atlas A

Low carbon, tungsten hot work, air or oil hardening steel, for hot nut tools, punches, and dies subject to severe shock and temperature changes in service. Contains C 0.30, Cr 3.00, V 0.45, W 9.00. Allegheny Ludlum Steel Corp., Watervliet, N. Y.; also, Edgcomb Steel Co., Philadelphia.

Atlas B

General purpose, tungsten hot work, air or oil hardening steel for copper and brass forging dies, hot forming dies, swedging dies, etc. Good resistance to heat with fair toughness. Contains C 0.40, Cr 3.00, V 0.45, W 12.00. Allegheny Ludlum Steel Corp., Watervliet, N. Y.; also, Edgcomb Steel Co., Philadelphia.

Atlas Double Extra

A plain carbon steel. Canadian Atlas Steel, Ltd., Welland, Ont., Canada.

Atlas Extra

A plain carbon steel. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

Atlas Hot Die

A special alloy steel, containing W. Allegheny Ludlum Steel Corp., Pittsburgh.

Atlas 93

Chrome-moly, oil hardening shock resisting steel, for leather and fabric cutting dies, wood working tools, etc. Moderate hardness with fair toughness. Contains C 0.55, Cr 0.65, Mn 0.55, Mo 0.35. Allegheny Ludlum Steel Corp., Watervliet, N. Y.; also Edgcomb Steel Co., Philadelphia.

Atlas Q

A special alloy steel, containing Cr. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

Atlas Refined

A plain carbon steel. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

Atlas Special Alloy

A special alloy steel, containing Va. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

Atlas Triple Extra

A special alloy steel, containing W. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

Atmodie

Air hardening steel for blanking, forming and trimming dies, punches, shear blades, etc. Is non-deforming and long wearing. Contains C 1.00, Cr 5.25, Mn 0.65, V 0.25, Mo 1.10, Si 0.25. Columbia Tool Steel Co., Chicago Heights, Ill.

Atsco AR

A water hardening steel, for scari-fier teeth, rooterpoints, maintainer blades, snow plow shoes, snow plow blades, shovel teeth, bucket lips, implement tools. Contains C 0.90, Mn 0.75 to 0.85, Mo 0.30. Atlantic Steel Co., New York.

Atsco Special

Water hardening steel, for cutting, drilling and chipping rock drills, pick points, concrete wreckers, demolition tools, channeler bars. Contains C 0.50 to 1.00, Mn 0.50 to 1.00, Mo 0.30. Atlantic Steel Co., New York.

Atsil

Oil hardening steel, for shear blades and punches, pneumatic tools and chisels. Contains C 0.50, Mn 0.60, W 0.50, Mo 0.30, Si 1.30. Atlantic Steel Co., New York.

Auburn Brands

Auburn Extra, Standard, Special, Tool Maker, Perfection, Cast, and Hot

Die. Hammond & Irving, Inc., Auburn, N. Y.

Avesta

All grades of steel. A. Johnson & Co., Inc., New York.

A. W. Special

A special alloy steel. Firth-Sterling Steel Co., McKeesport, Pa.

B

Badger

A special alloy steel, containing Cr and W. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

Balfosteel Brand

A plain carbon steel. Adams & Osgood Steel Co., Boston.

Balfour's Shoe Die

A plain carbon steel. Adams & Osgood Steel Co., Boston.

Ball Bearing 136

A special alloy steel. Jessop Steel Co., Washington, Pa.

Baltoc

A high speed steel, containing W 18, Cr 4, V 1, Co 4. Halcomb Steel Co., Syracuse, N. Y.

B.B.Hot Die

An oil or air hardening, red hard and tough steel, for bolt dies, hot punches, hot extrusion dies, die casting dies, etc., containing C 0.40, W 10.00, Cr 3.50, V 0.50. Wm. Jessop & Sons, Inc., New York.

B. D. Tool

A plain carbon steel. Crucible Steel Co. of America, New York.

B 4

High speed hot work steel, for hot work dies. Has resistance to heat checking. Contains C 0.45, Cr 3.50, Mn 0.25, W 13.25, Si 0.25. Universal-Cyclops Steel Co., Bridgeville, Pa.

B 6

High speed steel, for cutting tools. Is abrasion and heat resistant. Contains C as desired, Cr 4.00, Mn 0.25, V 1.10, W 18.00, Si 0.25. Universal-Cyclops Steel Co., Bridgeville, Pa.

B 7

High speed steel, for cutting tools. Is abrasion and heat resistant. Contains C 0.75, Cr 4.25, Mn 0.30, Co 5.00, V 1.10, W 18.00, Mo 0.50, Si 0.25. Universal-Cyclops Steel Co., Bridgeville, Pa.

B 8

High speed steel, for cutting tools. Is abrasion and heat resistant. Contains C 0.78, Cr 4.25, Mn 0.30, Co 5.00, V 2.25, W 14.00, Mo 0.50, Si 0.25. Universal-Cyclops Steel Co., Bridgeville, Pa.

B 9

High speed steel, for cutting tools. Is abrasion and heat resistant. Contains C 0.80, Cr 4.25, Mn 0.30, V 2.10, W 18.50, Mo 0.50, Si 0.30. Universal-Cyclops Steel Co., Bridgeville, Pa.

B 10

High speed steel, for cutting tools. Is abrasion and heat resistant. Contains C 0.80, Cr 4.50, Mn 0.25, Co 7.50, V 1.75, W 18.50, Mo 0.80, Si 0.25. Universal-Cyclops Steel Co., Bridgeville, Pa.

B 44

High speed hot work steel, for cutting tools. Has resistance to abrasion and heat checking. Contains C 0.35, Cr 3.50, Mn 0.25, V 0.45, W 11.00, Si 0.20. Universal-Cyclops Steel Co., Bridgeville, Pa.

Beacon

A plain carbon steel. Edgecomb Steel Co., Philadelphia.

Bell Brand

A plain carbon steel. Patriarche & Bell, New York.

Bell Special

A plain carbon steel. Patriarche & Bell, New York.

Benecke

A special purpose tool steel made to order. Alexander Benecke, New York.

Best

A plain carbon steel. Boyd-Wagner Co., Chicago.

Best

A plain carbon steel. Firth-Sterling Steel Co., McKeesport, Pa.

Best

A water hardening steel, containing C as specified, Mn 0.25, V 0.20, Si 0.20, P max. 0.030, S max. 0.030. Bethlehem Steel Co., Bethlehem, Pa.

Best

Water hardening steel, for tools and dies. Carbon content as ordered. Henry Disston & Sons, Inc., Philadelphia.

Best Cast Steel (Yellow Label)

A water hardening, shock resisting steel, for blanking and forming dies, cutting tools, drills, milling cutters, etc., containing C 1.00-1.10. Wm. Jessop & Sons, Inc., New York.

Bethlehem Air Hardening

An air hardening die steel, containing C 1.00, Cr 1.88, Mn 2.00, Mo 1.00. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem Extra Special

An 18-4-2 high speed steel for cutting tools, containing C 0.73, Cr 4.25, Mn 0.25, V 2.25, W 14.00, Si 0.25. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem Finishing

A finishing steel for edge tools, containing C 1.30, Mn 0.30, W 4.00, Mo 0.40, Si 0.40. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem No. 445 Hot Work

A heat resistant steel for hot work dies, containing C 0.95, Cr 3.60, Mn 0.30, Si 0.25. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem H M

A molybdenum-tungsten high speed steel for cutting tools, containing C as specified, Cr 3.75, Mn 0.25, V 1.10, W 1.55, Mo 8.70, Si 0.25. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem H V

An 18-4-2 high speed steel for cutting tools, containing C 0.80, Cr 4.50, Mn 0.25, V 2.10, W 18.50, Mo 0.65, Si 0.25. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem Penco

A finishing tool steel, containing W and Mo. Peninsular Steel Co., Detroit.

Bethlehem (H S) Special

An 18-4-1 high speed steel for cutting tools, containing C as specified, Cr 4.00, Mn 0.25, V 1.05, W 18.00, Si 0.25. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem Tool Room

An oil hardening, non-deforming steel for dies, containing C 0.90, Cr 0.50, Mn 1.20, V 0.20, W 0.50, Si 0.30. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem X

A water hardening steel, containing C as specified, Mn 0.25, Si 0.20, P max. 0.030, S max. 0.030. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem—XCL

A water hardening steel, containing C as specified, Mn 0.25, Si 0.20, P max. 0.020, S max. 0.020. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem XX

A water hardening steel, containing C as specified, Mn 0.25, Si 0.20, P max. 0.020, S max. 0.020. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem XXX

A water hardening steel, containing C as specified, Mn 0.25, Si 0.20, P max. 0.015, S max. 0.015. Bethlehem Steel Co., Bethlehem, Pa.

Bit and Jar

A special alloy steel, containing Cr and Mn. The Midvale Co., Philadelphia.

Black Diamond Tool

Standard tool steel, for blacksmiths' tools, boilermakers' tools, channeler tools, chisels, drills, hammers, picks, pins, planer tools, etc. Carbon as desired. Crucible Steel Co. of America, New York.

Black Label

Air hardening steel, for general tool and die work. Contains C 1.50 to 1.60, Cr 11.5 to 12.5, Mn 0.25 to 0.35, V 0.15 to 0.25, Mo 0.70 to 0.80, Si 0.25 to 0.35. Craine-Schrage Steel Co., Detroit.

Black Label

A plain carbon steel. William Jessop & Sons, Inc., New York.

Black Label

A water hardening steel, for punches, blanking dies, etc. Contains C 1.10, Cr 0.50, Mn 0.30, V 0.20, Si 0.20. Peninsular Steel Co., Detroit.

Blue Anchor

Carbon drill rods, for twist drills, taps, dies, reamers, punches, dental instruments, jewelers' and engravers' tools. Contains C 1.20 to 1.35, Cr 0.10 max., Ni 0.10 max., Mn 0.15 to 0.40, Si 0.20 max., P 0.05 max., S 0.04 max. Anchor Drawn Steel Co., Latrobe, Pa.

Blue Anchor Drill Rod

A plain carbon steel. Anchor Drawn Steel Co., Latrobe, Pa.

Blue Chip H V and H M

High speed steel, for general purpose cutting tools, containing carbon as required, Cr 4.00, V 1.00, W 18.00. Firth-Sterling Steel Co., McKeesport, Pa.

Blue Edge

A shock resisting chisel and punch steel. Vulcan Crucible Steel Co., Aliquippa, Pa.

Blue Label

A plain carbon steel. Adams & Os-good Steel Co., Boston.

Blue Label

An extra carbon steel. Simonds Saw & Steel Co., Lockport, N. Y.

Blue Label

Hard and tough water hardening steel for tools and dies. Contains C 0.80 to 1.10, Mn 0.40 max., Si 0.10 to 0.20. Heller Brothers Co., Newark, N. J.

Blue Label

A water hardening steel, for drawing dies and tools, forming dies, etc. Contains C 1.05, Mn 0.30, V 0.18, Si 0.20. Peninsular Steel Co., Detroit.

B. M. S.

Air hardening steel, for chisels and punches. Contains Cr 1.70, Ni 3.50, Mn 0.30-0.40, Mo 0.20, Si 0.20-0.30. Hidalgo Steel Co., New York.

B.N.D.

Special alloy, air hardening steel, for gripper dies. Has high toughness and fatigue resistance. Contains C 0.90-1.00, Cr 3.50. H. Boker & Co., Inc., New York.

B.O.H.

Non-deforming, oil hardening steel, for forming and blanking dies, cams, punches, perforating dies, forming and crimping rolls, plug gages, etc. Has high resistance to abrasion. Available in castings and bar stock. Contains C 0.90, Cr 0.50, Mn 1.25, V 0.20, W 0.50, Si 0.35, S 0.02, P 0.02. H. Boker & Co., Inc., New York.

Boker Power Chisel

A special alloy steel, containing W and Cr. H. Boker & Co., Inc., New York.

Bolt Die Regular

A special alloy steel, containing Cr. The Midvale Co., Philadelphia.

Bolt Die Special

A special alloy steel, containing Cr and W. The Midvale Co., Philadelphia.

Bonded Carbide

A super tungsten cobalt type high speed steel, containing 22 W, 5 Cr, 1.50 V, 12 Co. Braeburn Alloy Steel Corp., Braeburn, Pa.

Bonded Carbide Jr.

A tungsten cobalt high speed steel, containing 18 W, 4 Cr, 2 V, 8 Co. Braeburn Alloy Steel Corp., Braeburn, Pa.

Bowco O. H. Tubing

A special alloy steel. Boyd-Wagner Co., Chicago.

Bowco W. H. Tubing

A special alloy steel. Boyd-Wagner Co., Chicago.

BRM

An oil hardening steel, for lathe, planer, shaper tools. Contains C 0.75 to 0.85, Cr 4.00 to 4.25, Mn 0.30, V 2.00 to 2.20, W 18.00 to 20.00, Mo 0.50 to 0.70, Si 0.35. Agawam Tool Co., West Springfield, Mass.

Brown Label

Hot work steel for dies, shear blades, punches, etc. Is medium heat resisting. Contains C 0.85 to 1.00, Cr 3.00 to 4.00, Mn 0.30 to 0.40, Si 0.15 to 0.30. Heller Brothers Co., Newark, N. J.

Brown Label

A fatigue resisting, oil hardening steel, for hot and cold header dies, hobs, pneumatic tools, etc. Contains C 0.50, Cr 1.10, Mn 0.20, V 0.20, W 2.50, Si 0.75. Peninsular Steel Co., Detroit.

Buster Alloy

Punch and chisel steel for heavy shock and impact tools, hand and pneumatic chisels, shear blades, hot heading operations. Available in several carbon ranges. Contains Cr 1.20, Mn 0.25, V 0.25, W 2.25, Si 0.35. Columbia Tool Steel Co., Chicago Heights, Ill.

B W Point 5

A plain carbon steel. Boyd-Wagner Co., Chicago.

C**Calo Ferro**

A special alloy hot work steel. Vulcan Crucible Steel Co., Aliquippa, Pa.

Cannon

Oil hardening, regular high speed steel, containing C 0.65-0.70, Cr 3.50, Mn 0.30, V 1.00, W 16.00-17.00, Si 0.35. Darwin & Milner, Inc., Cleveland.

Cannon Special

Oil hardening, improved high speed steel, containing C 0.78-0.85, Cr 4.25, Mn 0.30, V 2.25, W 18.00-20.00, Mo 0.50-0.70, Si 0.35. Darwin & Milner, Inc., Cleveland.

Cannon Vanadium

Oil hardening, improved high speed steel, containing C 0.95-1.10, Cr 3.75-4.00, Mn 0.40, V 3.00-3.50, W 18.00-50.00, Mo 0.70-0.90, Si 0.35. Darwin & Milner, Inc., Cleveland.

Carbo Tool

Carbon die steel. Contains C 1.00. Bissett Steel Co., Cleveland.

Carboly

Tungsten carbide is basic ingredient, with tantalum carbide and/or titanium carbide, or other carbides, as supplementary ingredient in certain grades. For machining all metals and non-metals, drawing dies, etc. Is used on machine parts subject to severe wear. Carboly Co., Inc., Detroit.

Carbomang

Oil hardening steel, for general tool steel requirements. Is tough and fatigue resistant. Contains C 0.95, Cr 0.60, Mn 1.05, W 0.50, and Si 0.35. Detroit Alloy Steel Co., Detroit.

Carbon

Water hardening steel, for all types of tools and dies of short life. Contains C as desired, Mn 0.25, Si 0.20. Universal-Cyclops Steel Co., Bridgeville, Pa.

Carbon Cold Header

Water hardening, carbon tool steel, for cold heading dies, punches, etc. Contains C 0.95, Mn 0.25, Si 0.20. Latrobe Electric Steel Co., Latrobe, Pa.

Carbon Tool

A plain carbon steel. The Midvale Co., Philadelphia.

Carbon Tool Extra

Same as above.

Carbon Vanadium C-V

Drill rods, for punches, pins, bushings, dental tools, taps, dies, masonry

drills and keys for adjusting reamers. Contains C 0.95 to 1.10, Mn 0.10 to 0.30, V 0.15 to 0.25, Si 0.15 to 0.25, P 0.025 max., S 0.025 max. Anchor Drawn Steel Co., Latrobe, Pa.

Carbon-Vanadium C-V

Water-hardening steel for dies, punches, taps, etc., containing C 1.00-1.10, Cr 0.20-0.40, Mn 0.30, V 0.25-0.35, Si 0.20. Darwin & Milner, Inc., Cleveland.

Caroga

A special alloy steel, containing Cr and V. Ludlum Steel Co., Watervliet, N. Y.

Caroph Carbon

A water hardening steel. Contains C 0.60 to 1.20. The Midvale Co., Philadelphia.

Cartun

A special alloy steel, containing W and Cr. Delaware Tool Steel Corp., Wilmington, Del.

Cast Steel—Ordinary (Black Label)

A water hardening, shock resisting steel, for drift pins, blacksmiths' tools, punches, planing tools, shear blades, etc., containing C 1.00-1.10. Wm. Jessop & Sons, Inc., New York.

Cast Steel—Special (Green Label)

A water hardening, shock resisting steel, for burnishing tools, stone and wood chisels, deep drawing dies, shear blades, punches, taps, etc., containing C 1.00-1.10. Wm. Jessop & Sons, Inc., New York.

Castaloy

A non-deforming, air hardening steel, for machine parts, cams, and cutting, forming, trimming and drawing dies. Contains C 1.50, Cr 13.00, Mn 0.60, Co 0.70, V 0.40, Mo 0.85 and Si 0.60. Detroit Alloy Steel Co., Detroit.

C. C. A. Die

A special alloy steel. Crucible Steel Co. of America, New York.

CCS Die Casting

Alloy hot work steel, for die casting aluminum and brass, brass forging dies, extrusion dies, punches, gripper dies and mandrels. Contains C 0.40, Cr 5.25, V 0.40, W 4.25, Si 1.15. Crucible Steel Co. of America, New York.

C.C.S. Die Casting

An oil-hardening or air-hardening steel, for aluminum and brass die casting. Contains C 0.35, Cr 5.25, Mn 0.35, Co 0.40, W 4.25, Si 1.15. HawkrIDGE Bros. Co., Boston.

Celero

Fast finishing steel for metal cutting. Is abrasion resistant. Contains C 1.35, Cr 0.25, W 2.75. Henry Disston & Sons, Inc., Philadelphia.

Cello Vanadium

Oil hardening, non-deforming steel, for dies, taps, reamers, hob, broaches. Contains C 0.85 to 0.95, Cr 0.40 to 0.60, Mn 1.00 to 1.25, V 0.10 to 0.20, W 0.40 to 0.60, Si 0.25 to 0.45. McInnes Steel Co., Corry, Pa.

Centaur

A plain carbon steel. Jessop Steel Co., Washington, Pa.

Centaur

A plain carbon steel. Edgar T. Ward's Sons Co., Pittsburgh.

(TO BE CONTINUED IN NEXT ISSUE)

Gearmakers Discuss

PAPERS dealing with problems relating to production of high precision gears for the aircraft industry were the highlight of the 25th annual meeting of the American Gear Manufacturers Association held at Hot Springs, Va., May 5-7. Several standard practices were adopted by the association and a number of committee research reports on gear design calculations were presented. Non-technical talks dealt with the national defense program and questions of material shortages. New officers were also elected.

Walter P. Schmitter, chief engineer of Falk Corp., Milwaukee, was advanced from vice-president to president of the association, succeeding U. Seth Eberhardt, president of the Newark Gear Cutting Machine Co. The new vice-president is John H. Flagg, general manager, Watson-Flagg Machine Co., Paterson, N. J., who has been chairman of one of the most active committees of the association, that dealing with gear motors. L. R. Botsai, manager of the gearing department, East Pittsburgh division of Westinghouse Electric & Mfg. Co., was reelected treasurer. J. C. McQuiston continues as secretary. Douglas T. Hamilton, advertising manager of Fellows Gear Shaper Co., Springfield, Vt., was elected to the executive committee and Don W. Diefendorf, president, Diefendorf Gear Co., Syracuse, and Paul Christenson, vice-president Cincinnati Gear Co., were reelected to the executive committee. A new constitution and by-laws were adopted. It was announced that the semi-annual meeting of the association will be held at the Edgewater Beach Hotel, Chicago, Oct. 20-22.

New Member Companies

During the past six months five new member companies have been added: American Stock Gear Co., Chicago; Automotive Gear Co., Richmond, Ind.; Michigan Tool Co., Detroit; Pacific Tool & Gear Co., San Francisco, and American Gear Mfg. Co., Chicago. Three associate company members were also added:

American Pulley Co., Philadelphia; Cotta Gear Co., Rockford; and Kearney & Trecker Corp., Milwaukee.

Standards Adopted

In the interests of speeding up national defense efforts, the association adopted a revision of a recommended practice for design and application of concentric and parallel shaft gear motors. Standardization of gear ratios and output speeds, reducing the number from 100 to 35—representing a joint program worked out in cooperation with the National Electric Manufacturers' Association—will be put into commercial practice as rapidly as possible. Owing to difficulties of changing over tool and fixture set-ups, however, the balance of the program will not become fully effective for at least six months. Formulas for durability rating of gear motors contained in this standard were worked out as part of an investigation conducted jointly by the gear motor and the helical-herringbone gear committees, presented as a research report at the meeting by Messrs. Flagg and Schmitter. Ratings are based on specific tooth contact pressures. Mr. Schmitter also presented a research report for his committee on a method for calculating the beam strength of helical gear teeth.

Also adopted by the association was a recommended practice on standard gear blanks—cast, forged or turned from bar stock—as drawn up by the helical and herringbone committee. These standard sizes will be put into use immediately.

Paul Wooton, Washington correspondent of McGraw-Hill Publishing Co., was the speaker at the annual dinner at which the new officers were installed. His talk gave a host of reasons why a defeatist attitude toward Great Britain should not prevail in this country. He stressed some of the handicaps under which the dictators are fighting and predicted an ultimate victory for the democracies. Production in Germany and

Italy is declining, he believes, while our production is rising in a breath-taking way. Shortage of machines and managerial skill has proved to be more of a bottleneck than expected, but there is no financial bottleneck anywhere. The tool situation Mr. Wooton considered serious, although there are still a lot of machine tools being operated only 40 hr. a week.

Warns of Rigid Control

Problems of securing materials in times of emergency were discussed the preceding evening by E. L. Shaner, president of the Penton Publishing Co. Warning that we are in for a degree of rigid control of production and prices far surpassing the experience of World War I, Mr. Shaner predicted that most industrial operations will be put in a straitjacket and that management will have freedom of action only to a very limited degree. He urged that manufacturers cooperate with Army and Navy officials, OPM departments and other government agencies in order to forestall the radical New Dealers and left-wing elements who would like nothing better than to see discredited the regular agencies for control of industry. If the government actually took over industry in the emergency, Mr. Shaner doubts that it would ever be returned to private initiative, once the emergency is over.

The speaker recited several instances where business men had been leaning too heavily on OPM in order to obtain needed materials. His advice was: "Employ all of your own resources to get materials before appealing to Washington. Don't squawk unless you have a reasonable case."

Industry Losing Men

R. C. Ball, in reporting for the industrial committee, declared that operator training programs were being greatly handicapped through loss of men through the draft. He proposed that shops plan to train men past 35 years of age to offset the losses of younger men. Others indicated that many boys under 21 were being trained. Mr.

Defense Problems . . .

Eberhardt warned that it is necessary to put in an application for a second deferment five months after the date of the original deferment of needed workers. Others brought out that blanket deferment of workers is not possible, but that most draft boards are reasonable if the number of hours required to train new workers is brought to their attention. In many shops, the shortage of personnel is more serious than that of materials.

Aircraft Gear Steels

From the point of view of machinability, different types of structure should be specified for medium carbon and carburizing type alloy steels used in the aircraft industry, according to Dr. N. E. Woldman, Eclipse Aviation Corp. Reviewing a previous paper, soon to be published in *THE IRON AGE*, Dr. Woldman indicated that for medium carbon steel, a spheroidized structure is desirable for the preliminary turning operations in the automatics, but that such a structure is a poor one for the finish gear cutting operations since the free ferrite tends to ball up on the tool and tear the surface. An intermediate box anneal is necessary to obtain the laminated pearlitic structure, which finishes better on the gear cutters.

The two principal carburizing steels used in the aircraft industry, SAE 2515 and 3312, because of their inherently lower carbon content, have more free ferrite and give greater difficulty in machining. Dr. Woldman suggested keeping the carbon on the high side of the range from the point of view of machinability and also for higher physical properties of the core. For these steels a spheroidized structure is to be avoided to prevent balling up of the metal on the tool, and for SAE 2515 a banded structure in the bar stock should likewise be shunned. This structure is composed of alternate bands of high and low carbon steel, with occasional bands of free ferrite.

The best type of steel to specify is a normalized and annealed bar stock having a laminated pearlitic structure. After this material has



W. P. SCHMITTER
President, American Gear Manufacturers Association

been put through the automatics, preparatory to gear cutting, it should be annealed around 1500 deg. F., cooled slowly to 400 deg. and water quenched. This treatment, Dr. Woldman says, gives the maximum machinability rating and best surface finish.

On the other hand, it is difficult to obtain SAE 3312 steel without a banded structure. For easy machining and long tool life in the gear cutting machines, the best structure is obtained by renormalizing the rough turned gear blanks and re-annealing to give a fine broken-up structure of pearlite and ferrite. The rough cut gear is then carburized, the teeth finish cut and the gear hardened. By close control of procedure, distortion can be held low.

Ageing in Ice

In some steels, Dr. Woldman said, it is difficult to break down the austenite to give the hard martensitic structure desired, leaving a soft skin on the gears. This austenitic layer is often considered a decarburized skin, but it is not. It may run 0.010 to 0.040 in. thick.

By packing the gears in ice for 10 days, the retained austenite will break down. Liquid air will accelerate the process, or a long tempering at 300 deg. F. will accomplish the same result. On the other hand, too rapid cooling of SAE 3312 after carburizing will produce too much martensite and give a surface with a hardness of 50-55 Rockwell C, entirely too hard to machine. To overcome this condition, Dr. Woldman suggested a 40-hr. cooling period from the carburizing heat.

Because of present shortages of nickel, Dr. Woldman named as possible substitutes for SAE 2515 and 3312 steels, chrome vanadium steels like SAE 4820 and 4615, chrome molybdenum steels and the Chrysler Amola steels. Machinability of SAE 4820 and 4615 steels is on a par with other low alloy steels, but they must be hardened at a higher temperature, aggravating scaling and distortion.

Heat-treating problems of aircraft gears were also discussed by John L. Buehler, co-owner, Indiana Gear Works, who indicated that for best machinability, carburizing steels in his plant were quenched in oil after an hour's soak around 1500 deg. F., then tempered at 800-1200 deg. for several hours, depending upon the analysis. The result is that there is precipitated from the austenitic stage very finely spheroidized sorbite, homogeneous and "crisp," which machines with clean, hard chips that do not adhere to the cutting tool.

Heating Is Critical

Heating the steel through the critical range, Mr. Buehler considered the most critical part of the heat-treating cycle because of the fact that between the A_{c1} and A_{c2} points the steel actually contracts and then begins to expand again past the A_{c2} point. With light and heavy sections, the light section may be contracting while the heavy section is still expanding, causing stretching beyond the hot elastic limit and causing the material to take a permanent set (warpage).

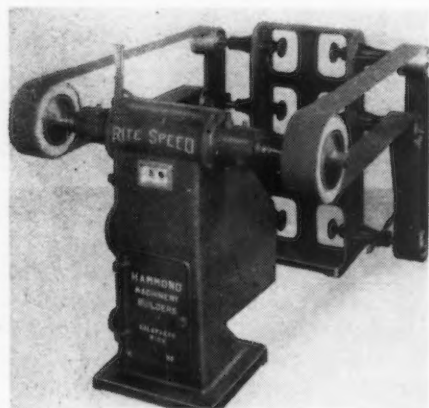
(CONCLUDED ON PAGE 102)

New Equipment . . .

Finishing Apparatus

Here are described some of the latest developments in polishing, painting, spraying, degreasing and cleaning apparatus, as well as new enamels, paints and finishes.

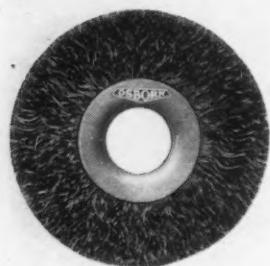
ABRASIVE belt stand to be used in conjunction with polishing and buffing lathes has just been brought out by *Hammond Machinery Builders*, 1612 Douglas Avenue, Kalamazoo, Mich. This stand is shown together with a



Rite-Speed lathe equipped with 5 in. belts, but wider or narrower belts can be furnished. Proper tension of the belts is maintained by an adjustable tightener pulley and the belts can be quickly removed and replaced. It is claimed that these abrasive belts afford a definite economy for many applications over set-up wheels.

New Wheel Brushes

AN outstanding development in the manufacture of power driven wheel brushes has been an-



nounced by the *Osborn Mfg. Co.*, Cleveland. It is the Ringlock method of construction which securely locks in the brush material by means of a one-piece ring and a sleeve. The design provides a denser brushing surface, and reduces breaking of the brush material to a minimum. Wire wheel brushes are made in diameters from 1 to 12 in. The dense surface improves speed and efficiency of brushing operation and it is expected that Ringlock brush sections will broaden the use of wheel brushes in industry. Tampico brushes also are made by the new method.

Disk Sanders, Electric Polishers

COMPACT powerful sanders built into a strong aluminum housing with seal type ball bearings on armature and spindle, precision spiral gears, totally enclosed double pole switch and other new features



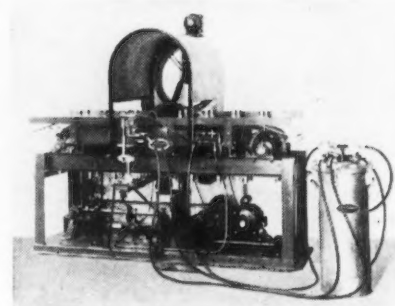
is claimed to be most satisfactory in sanding, grinding, buffing and surfacing of wood, metal and concrete. The sanders are supplied by *Stanley Electric Tools Division*, New Britain, Conn., complete with bevel type flexible pad, abrasive disks, wrenches and heavy cable. Varied accessories are available. Flare cup grinding wheels can be

used for the removal of welds and heavy irregularities. There are two models equipped with universal type motors. One model with a 7-in. diameter disk has a speed of 4200 r.p.m., a 9-in. type rotates at 3300 r.p.m.

For the cleaning and polishing of metal, removal of stains or heat tints, this firm has developed two new 600 r.p.m. polishers, illustrated. Up to four brushes, 8 1/4 in. diameter, 1/2 in. width can be mounted on the arbor. Model 182 can be used both for polishing and, with an attachment, as a 1/2-in. drill, while Model 187 is a polisher only. Both models are equipped with universal motors.

Projectile Painting Apparatus

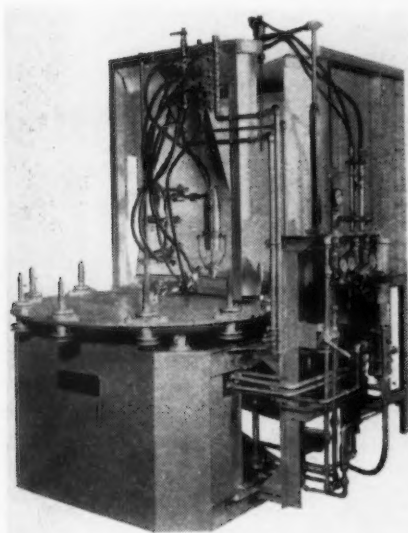
PAINTING of projectiles from .37 to 155 mm. is handled automatically with a special machine developed by the *Eclipse Air Brush Co., Inc.*, 400 Park Avenue, Newark, N. J. The machine consists of an indexed turntable with 36 rotating spindles carrying the shells in front of automatic spray guns which are synchronized with the turntable. After spraying, the projectiles are carried through a steam jacketed, tunnel type, drying oven mounted on a table opposite the spray gun. Rate of operation is 500 an hour when 6-min. pyroxylin



lacquer is sprayed. A second machine (illustrated) is designed to work in conjunction for the interior spraying of shells—or other cylindrical objects. Shells are picked up by metal arms from the conveyor belt, carried along in a horizontal position to a point in front of an automatic spray gun fitted with an extension nozzle. The gun is inserted into the slowly rotating shell and the painting operation is performed automatically, ending with the withdrawal of the nozzle from the shell and its deposition on the conveyor belt.

Shell Coating Machine

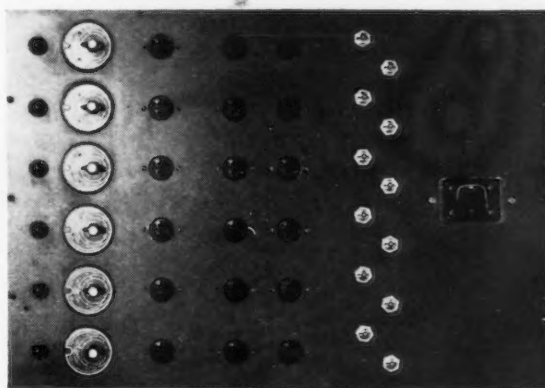
EFFICIENT, automatic coating the inside and outside of shells is possible with a new machine of the *DeVilbiss Co.*, Toledo. It is capable of coating shells ranging from 37 to 105 mm. Only loading



and unloading are manual. Shells are charged on spindles located around the edge of a rotating table. There are two guns operating simultaneously on two shells to spray exterior and interior. Insertion and removal of spray nozzle and rotation of shell during operation is automatic. Machines are designed to coat from 300 to 720 shells an hour according to size. All gages and controls are conveniently mounted. Assembly includes two pressure feed tanks for the paint and spray booths for removal of overspray and fumes. In addition to shells, tail pieces and fragmentary bomb sub-assemblies can be coated.

Control For Tumbling Barrels

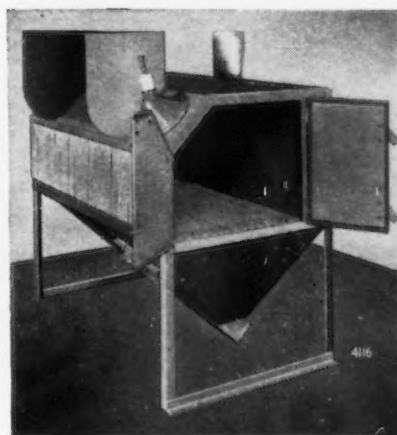
WHILE tumbling plastic parts to effect the removal of flash, a large loss results from breakage. A thorough investigation of the factors in the barrel tumbling operations led to the discovery that there is a critical time, above which the



main piece of molding would start to check, crack and break off. The optimum tumbling period can be assured by the use of a special timing device designed by the *R. W. Cramer Co., Inc.*, Centerbrook, Conn. This is a large panel board upon which are mounted six electrical time controlling switches for use with a large number of tumbling barrels. The switches will stop the operation when the set critical period has been reached. It is claimed that in one instance, using soap water and small wooden cubes and marbles to polish the plastics and to remove surplus flash, breakage was reduced by 70 per cent.

Blast Cabinet

IMPROVED supervision of castings during cleaning is made possible by a new blast cabinet of the *W. W. Sly Mfg. Co.*, Cleveland. Two lights are mounted at the



front, throwing the light from the operator on the castings. The view is shielded by a protective hood, shutting off the light at top and sides. Large doors at both ends provide easy access to the interior. Cabinet shown is one of a complete line and the blasting space measures 36 x 72 x 30 in. It is used extensively for thorough cleaning of small or intricate parts and can be furnished with induction type blast gun attached to bottom of cabinet hopper or with positive pressure blast tank below the cabinet. It furthermore can be supplied with bucket elevator and pressure blast tank on floor level.

Polishing Compounds

FOR polishing stainless steel, a complete line of rouges and other compounds has been developed by the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. An outstanding constituent of these polishing compounds is the special levigated alumina flour used. Research has been in progress for some time and has resulted in the perfection of a variety of grades and numbers to produce the finishes called for in the manufacture of metal products—from rough ground to mirror finishes.

Polisher's Brick

AS an improvement on the old lump pumice stone, the *J. J. Siefen Co.*, 5657 Lauderdale Avenue, Detroit, has developed a polisher's brick. This is produced in standard brick size for easy storing and greater cleanliness. Due to the greater ease of handling, it is more convenient and economical than lump pumice when used for the absorption of grease from polishing wheels, in keeping the wheel surface open and free cutting.

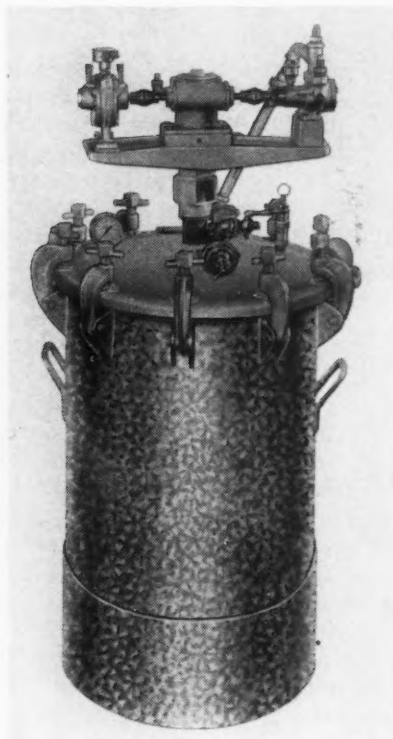
Spray Gun

WIDE surfaces can be sprayed with model Kingbee spray gun of the *H. O. Hommel Co.*, 211 Fourth Avenue, Pittsburgh. This instrument has a wider spray and finer atomization, speedier distribution of material. It is cleaned easily and will not clog. Built sturdily, it will withstand a great

deal of wear with a minimum of repair.

Small Circulating System

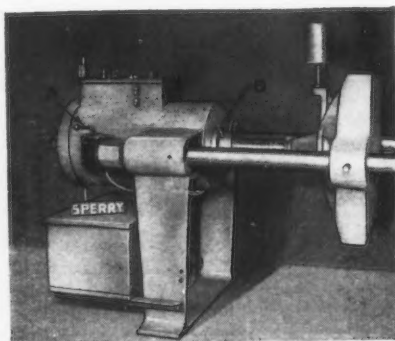
OF special interest to the smaller manufacturer are the small paint circulating systems for finishing room use just announced by the *DeVilbiss Co.*, Toledo, making available the economies, safety and convenience of the circulating sys-



tem of paint delivery. Systems will supply up to six spray guns in continuous operation. The container has a capacity of 30 or 60 gal. The motor-speed reducer-pump combination, mounted on the lid of the tank, is available with air or electric motors. Three of these QBM systems are available: System A delivers fluid over a loop not longer than 200 ft. with a minimum internal diameter of $\frac{1}{2}$ in. Material is forced through the loop only by air pressure as it is used and not recirculated. In System B the loop can be as long as 450 ft. with diameter of $\frac{3}{4}$ in. Individual fluid regulators for each gun provide better fluid pressure control. The material is kept uniformly mixed by recirculation. System C further improves the mixing by recirculation through the head of each gun. Maximum length 200 ft., minimum diameter $\frac{1}{2}$ in.

Filter Press Closing Device

ELECTRICALLY operated oil hydraulic closing device for filter presses incorporating novel features for easier, safer, more economical operation, has been developed by *D. R. Sperry & Co.*,



Batavia, Ill. This type EHC can be installed on existing filter presses. Usual hydraulic valves have been eliminated and adjustment is fully controlled. To open handle A is moved forward, locknut B is loosened, filler block swung upwards and the movable head pulled back into open position. To close, head is pulled forward to contact plates and frame, filler block dropped into place, controller handle moved forward, press squeezed to desired pressure and locknut tightened. The device is powered by electricity.

Air Powered Mixer

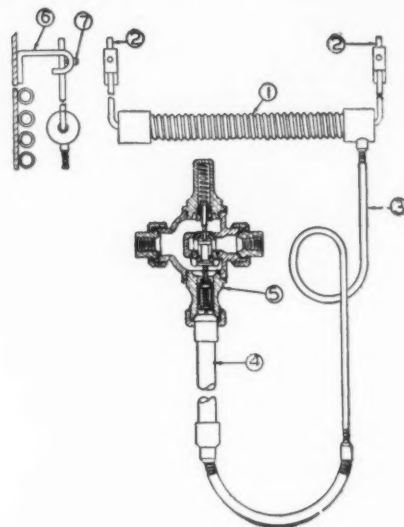
EXPLOSION-PROOF compressed air motor, completely enclosed and adjustable over a wide range of speeds is the main feature of a new propeller type mixer designed for 50 to 100 gal. containers, produced by the *Eastern Engineering Co.*, New Haven, Conn. The ball-bearing motor is rated at $\frac{1}{4}$



hp. with a maximum speed of 2000 r.p.m. on 100 lb. pressure. It has an exhaust silencer. For convenient attachment to the edge of the containers, an adjustable clamp is provided. The 4-in. diameter nickel plated bronze propeller is fastened on to a stainless steel shaft.

Vapor Line Control

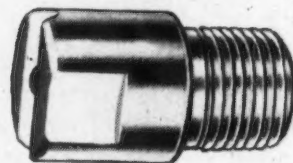
TRICHLORETHYLENE vapor and other solvents are often used for degreasing metal parts. Temperature control for the heating medium is provided by the vapor line control of the *Sarco Co., Inc.*, 183 Madison Avenue, New York. This control maintains automatically the correct vapor line regardless of variations in load and intermittent operation. This saves solvent, prevents boiling over of the injurious vapors and the formation of rust in the degreaser. The regulator is self-contained and operated in the liquid expansion system of the sensitive bulb or thermostat (1). It exposes a very large surface to the influence of the vapor in relation to its content, making for high sensitivity. Temperature



adjustment is made by sliding bulb (1) up or down in bracket (6) until a position is found for the vapor line in the tank which maintains the correct boiling temperature (usually 175 deg. F.). It is available in sizes $\frac{1}{2}$ to 2 in. for temperatures up to 400 deg. F.

Flat Spray Nozzle

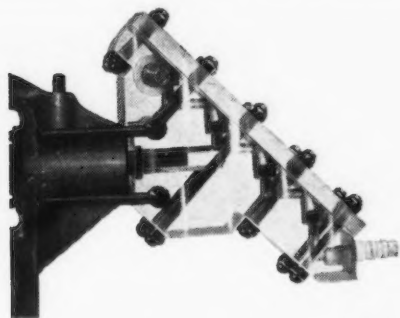
SIMPLE flat spray nozzle as illustrated has just been placed on the market by *Spraying Systems Co.*, 4021-P West Lake Street, Chicago. Spray pattern is flat with slightly heavy center at higher pressures, and can be had in a



number of different spray angles. Nozzles are available in brass or iron for $\frac{1}{8}$ to $\frac{1}{2}$ in. male pipe connection. Capacities range from 0.5 to 10 gal. per min. at 10 lb. pressure, and 1 to 20 gal. per min. at 40 lb.

Plastic Pump

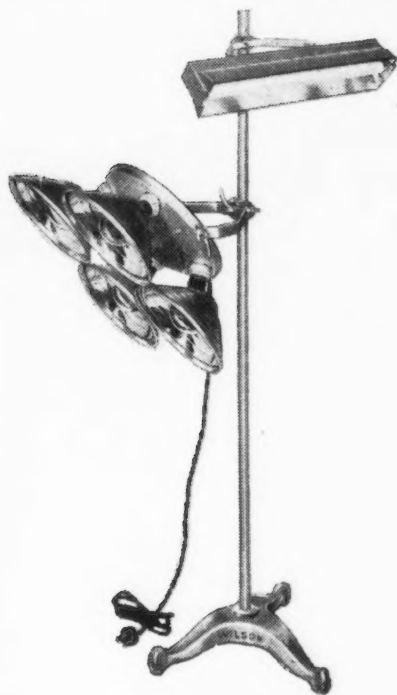
MACHINED from a solid block of transparent plastic material, a new pump for handling dilute acids and solutions permits inspection at all times. Inlet and outlet hose nipples are also of plastic construction, the piston is Hastelloy C metal. The step-type valve assembly



bly permits easy cleaning without disturbing the pipe connections. Pumps are available from *Milton Roy*, 1307 East Mermaid Avenue, Philadelphia, in capacities from $\frac{1}{2}$ to 20 gal. per hr.

Drying Equipment

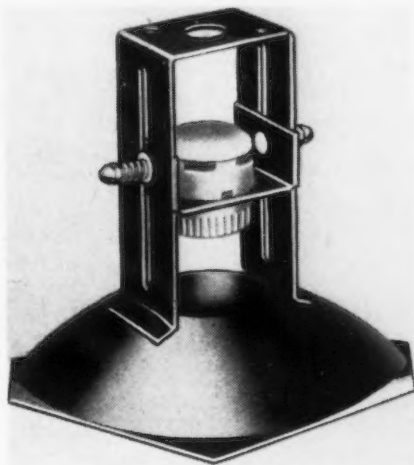
COMBINATION fluorescent and infra-red light to be used for paint and enamel drying, expanding parts, processing plastic materials and for experimental work, the Fluoro-Dryer is produced by *Wil-*



son Lighting, Inc., 411 South Clinton Street, Chicago. The fluorescent fixtures are fully adjustable and provide good light both for inspection and color matching. The drying fixture consists of four infra-red lamps, individually adjustable for a wide range of heat distribution. The drying time of synthetic enamels is reduced to between 4 and 20 min. The dryer is mounted on a portable stand which permits perpendicular adjustment of approximately 60 in.

Infra-Red Reflectors

HEAAT losses in infra-red baking tunnels have been greatly reduced by redesigned reflectors, announced by the *Fostoria Pressed Steel Corp.*, Fostoria, Ohio. These models QR and QM are hexagonal in shape, making it possible to ob-



tain an enclosed type of near infra-red tunnel. Reflectors measure $10\frac{1}{4}$ and $7\frac{5}{8}$ in. in diameter, and are available in single units or in multiple assemblies.

Corrosion Resistant Paint

TO protect metal surfaces against chemical reactions, for service wherever highly corrosive conditions disqualify other kinds of paint, a new kind of Koroseal paint, known as Koroplate, is announced by the *B. F. Goodrich Co.*, Akron, Ohio. Base of the coating is Koroseal, synthetic polyvinyl chloride, derived from coke, limestone and salt. The new paint is liquid at room temperature and can be either brushed or sprayed, and it may be thinned. It must be used in conjunction with a Koroseal primer. This semi-glossy black paint, when thoroughly dry, resists all acids except concentrated formic and acetic, and is not affected by the usual

plating solutions, nor does it foul them, although it is not recommended for constant immersion in liquids. The material has been used successfully on sour crude storage lines, underground pipes and for the painting of fume ducts in plating rooms.

Abrasion Tester

RESearch model Taber abraser is an efficient testing machine for evaluating resistance to rubbing abrasion of surface finishes and materials, such as paints, electroplates, plastics and textile fabrics. The abraser consists of a motor driven turntable on which the specimen is mounted, a counter to indicate the number of abrasion cycles, and two abrading wheels, which alternately rub back and forth, and at the same time criss-cross in their rolling path. These wheels are made in five types of closely controlled resilient material, charged with special grades of fine abrasive grain. Research model is equipped with standard load adjustments to vary from 125 to 1000 gm. pressure against the specimen. The wheel pressure selected should bring the test within a range from 500 to 5000 abrasion cycles. Supplementing the wear resistance test is the



shear-hardness test, performed by an attachment. The instrument is produced by *Taber Instrument Co.*, North Tonawanda, N. Y.

Infra-Red Lamps

THREE infra-red lamps will be placed on the market soon by *Wabash Appliance Corp.*, 335 Carol Street, Brooklyn. Two of the

lamps will be clear for use with reflectors, but the third will not require one, having its own reflector lining sealed inside. The manufacturer states that this lining will keep its heat-reflecting value for



the 6000-hr. life of the bulb, since it will be made of pure silver. Filaments of these lamps operate at a lower temperature, developing radiant energy at wave lengths of highly penetrating properties. Baking and drying processes are effected from inside out, instantly and uniformly.

Marking Enameled Metals

A NEW method of marking enameled metals without engraving has been discovered by the *Acromark Corp.*, Elizabeth, N. J. Said to reduce the marking time by at least ten to one, the process consists of a steel die application to the coated metal under electrically controlled conditions, resulting in a mark of metal or color pigment. Binocular parts, enameled tubes, instrument cases, etc., can be trademarked, numbered or otherwise marked by this process. A special machine to simplify the marking procedure has also been developed by Acromark. The method is also applicable to Roxalin metal coatings.

Paint Drying Improvements

U. S. Patent Nos. 2,236,397/8 have been granted to *New Wrinkle, Inc.*, Dayton, Ohio, covering a new process and related apparatus for drying finishes under even distribution of heat and ultraviolet radiation in an atmosphere enriched in oxygen and ozone. With

the process, wrinkle finishes can be obtained where non-wrinkling oil vehicles and coated compositions are employed that ordinarily dry to a smooth, glossy surface. The method and apparatus are also applicable to accelerating the drying of other types of coating compositions which dry to a hard, flexible film by oxidization, polymerization, or evaporation of solvents.

Zinc Blackening Process

IMMERSION process for the blackening of zinc and its alloys has been developed by the *Enthone Co.*, 442 Elm Street, New Haven, Conn. The process consists of immersing the zinc or zinc alloy in a solution of Ebonol Z salts, 1 lb. per gal., at a temperature between 150 and 212 deg. F. An adherent jet black finish is formed within 5 min. Preparation of the metal surface is similar to preparing work for plating. According to the manufacturer, 1 lb. of salts will blacken over 150 sq. ft. of zinc surface. The bath is not critical and requires little control. It is reported that the solution can be used for black-coating stainless steel, nickel silver, nickel and noble metals, by making a couple with these metals and a piece of zinc, that is using a zinc basket or fastening a sheet of zinc to the rack or basket in which the metals are to be blackened. The process is said to be particularly valuable for name plate finishing. The coat is so thin that it does not affect engineering tolerances.

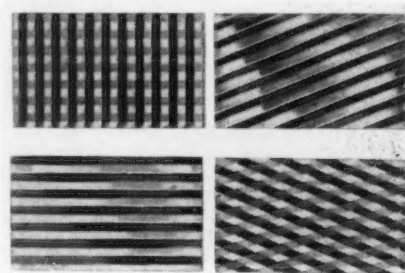
Plastic Coating for Metals

MARLOX, a plastic coating for metals is being introduced by *Marley Chemical Co.*, 983 East Milwaukee, Detroit. It is a plastic coating of the structural type and used either as a priming coat or purely for protection against rust and corrosion. For the material is claimed an almost complete absence of porosity. It is successfully applied to any metal by painting, spraying or dipping, under the formation of a thin, flexible coating. Flexibility and adhesion make it of particular value in coating welds where seams and folds are covered right up to the welded spot. As base coat, a tough durable bond between metal surface and any kind of finishing coat is provided. Dilution with Solveso is recommended. Tests showed a remarkable resis-

tance to humidity and to salt spray. The paint dries quickly and can be handled 5 to 10 min. after application, but 1 hr. drying is recommended.

Crimped Designs

SEVERAL interesting crimped designs in "American" bonded pre-finished metals have been introduced by the *American Nickeloid Co.*, Peru, Ill. The 7/16-in. crimp is available in horizontal,



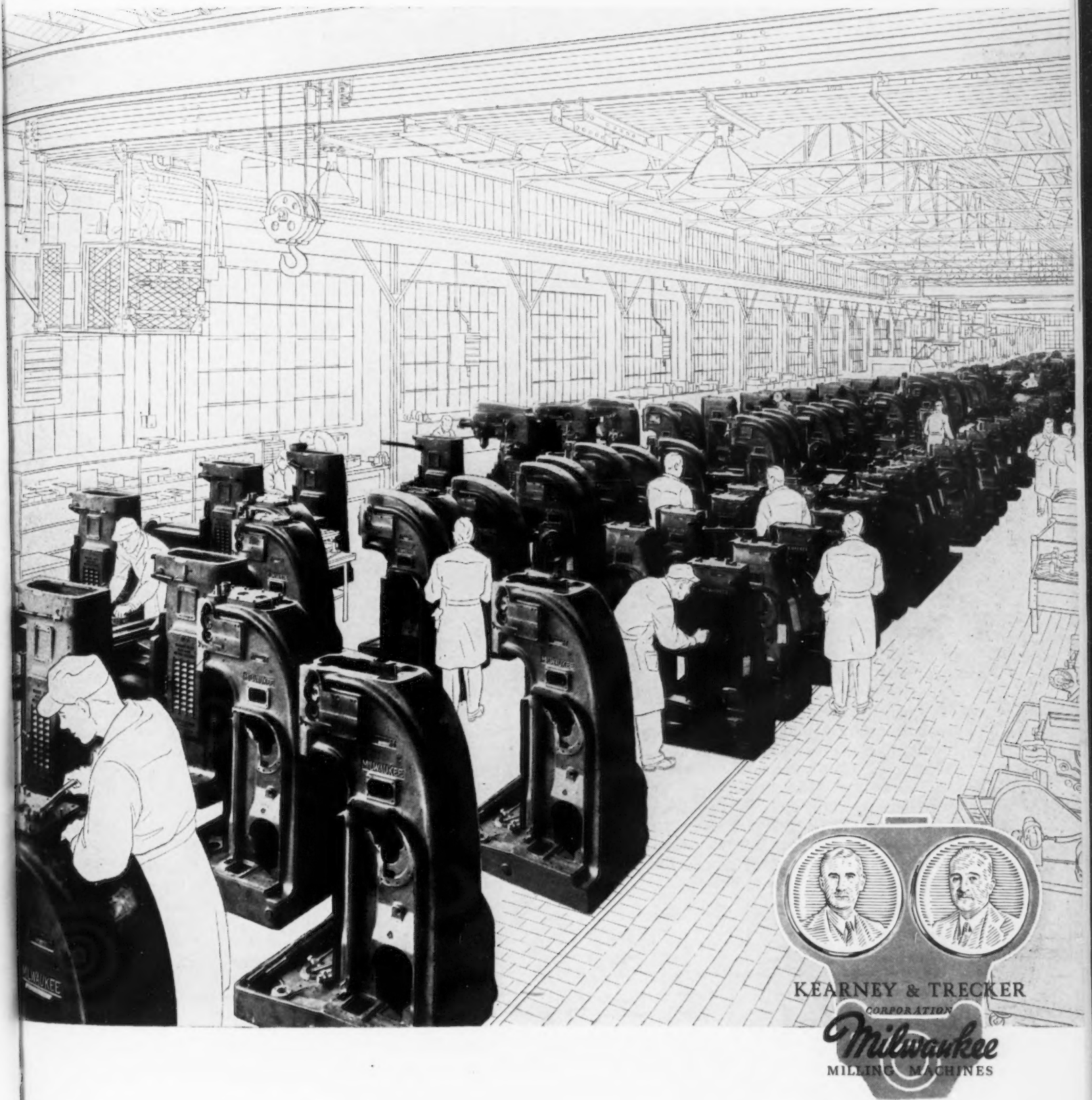
diagonal, square and diamond patterns over a range of metal thicknesses. Sheet sizes are available in most patterns up to 24 x 36 in. The oval crimp is produced in two widths 1/8 in. and 3/16 in. long, continuous coils, and in gages from 0.010 to 0.015 in. Both crimps are offered in a variety of finishes and materials. The oval crimp is used for inlay purposes, and the 7/16 in. crimp is being offered for a number of uses and applications requiring decorative treatment.

Enamels

SYNTHETIC enamels of a chlorinated rubber base which are known as Coprene and which dry so hard in 24 hours that they will not "paper print," are announced by *Mass & Waldstein Co.*, Newark, N. J. The hardening is not merely a surface change, but extends through the entire coating, making it resistant to handling, wrapping, etc. Similar hardening can be obtained by force drying at 200 deg. F. for 1 hr. These enamels are supplied in a variety of colors and finishes, are resistant to weather and household chemicals, and wear well.

This firm also produces finishes for plastics in all colors of both smooth and wrinkle enamels, in metallic lustres and in hammered effects. This material enables manufacturers to make their products out of low cost black and brown phenolic plastics and then finish them in any desired color or style.

MASS production of milling machines . . . a partial view
of the assembly floor of the largest plant in the world
devoted exclusively to the manufacture of milling machines.
KEARNEY & TRECKER CORPORATION • Milwaukee, Wis., U. S. A.



MILWAUKEE MILLING MACHINES

DETROIT — The bomber schedule is being upped on paper even more rapidly than automobile schedules are being trimmed by the same method, so it is impossible today to hazard a guess about what Detroit's motor car output will be a year from now, or even six months hence.

The only definite figure is that pertaining to maximum number of cars and trucks to be produced in the year beginning Aug. 1, 1941. OPM has established an arbitrary limitation of 4,224,152 vehicles, which is supposed to represent a 20.15 per cent reduction from the anticipated total of 5,289,974 units by July 31 of this year. Major producers — Ford, Chrysler and General Motors — were ordered to cut 21.5 per cent from their totals, with curtailment sched-

ules scaled down for the smaller manufacturers. Manufacturers making fewer than 2000 cars or trucks per year will not be curtailed. Companies making only trucks will be cut 5 to 10 per cent, depending upon the volume of their business. The medium-sized passenger car manufacturers—commonly called the independents—will be cut approximately 15 per cent.

The objective which OPM hopes to gain by this juggling of figures is simply that of erecting a bomb shelter over the heads of the independents, who might not be able to endure the sharp curtailment because loss of volume has a more immediate effect on their costs of production than it does in the case of the million-cars-a-year producers.

Just how many bombers the auto industry will be called upon to produce is anybody's guess, but the figure is constantly going up. Originally the figure was something like 100 a month for each of the major auto builders. They were going to supply that many sets of parts and sub-assemblies to three huge assembly plants being erected by the Army in the Midwest. It has been known for some time that this figure probably would be doubled—and the latest announcement about Ford is that its schedule is jumped from 100 a month to 270 a month.

Ford To Produce Complete Bomber

Ford is getting his way on the bomber program, too. From the start, Ford has insisted that he wanted to do more than merely supply parts and sub-assemblies—that he wanted to assemble complete bombers in his new airplane plant. The new factory at Ypsilanti was laid out in such a way that it could be expanded to provide an assembly line a mile or mile and a quarter long. However, the original contracts involving the Consolidated B-24 four-motor bomber limited

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Airplane bomber schedule being sharply raised on paper . . . Extent of automobile curtailment still in doubt . . . Current production still climbing . . . Purchases being made farther ahead, but vendors decline to name firm prices for 1942.

Ford to manufacture of parts and sub-assemblies. The tip-off that an important change in plans was under way came more than two weeks ago when it was learned that architects were preparing plans for approximately a 50 per cent extension to the aircraft building. Not long afterward it was learned officially that the War Department had asked Ford to nearly triple its original assignment. Now it is scheduled to produce 270 bombers a month.

Final assembly of at least 100 of these bombers will be done by Consolidated at two new plants going up at Tulsa and Fort Worth, but the balance of 170 will be completed here, according to new plans.

Other schedules for production of bombers are due for a similar boost, although probably

not as steep, since President Roosevelt has so far mentioned a top figure of only 500 per month, about 10 times the current monthly production rate.

This huge expansion in bomber production has made it virtually certain that all available supplies of special aircraft materials such as aluminum sheet will be required for bombers. This has been freely predicted in aircraft circles for many weeks and, as reported here several weeks ago, manufacturers of all other types of planes are engaged in a scramble to find substitute materials. Stainless is *not* the solution, it appears, because nickel shortages (especially) threaten to eliminate that material even before it can be fitted into airplane designs or production methods. As a result, some experiments are going on now in attempts to use high tensile carbon steels. Specifically, two have been discovered in the testing process. These are X4130 (chrome-moly) and a 0.27 carbon Amola steel. Working with these metals should be "right up the alley" for some of the automotive engineers and production men.

II GM Plants on Defense Work

When the defense program was just getting under way a booklet, "What it Takes," was issued by the Automobile Manufacturers Association to explain, step by step, just what it takes to make an automobile. The technique has now been employed in a very similar publication, "Hatching Warbirds," presented by the public relations department of Northrop Aircraft, Inc. A single paragraph from the foreword is worth quoting here:

"The American public confuses aircraft production methods with those developed by the automobile industry. The layman often assumes that large quantities of airplanes can be built with the same tools

Last Minute INFORMATION on Snap Gages



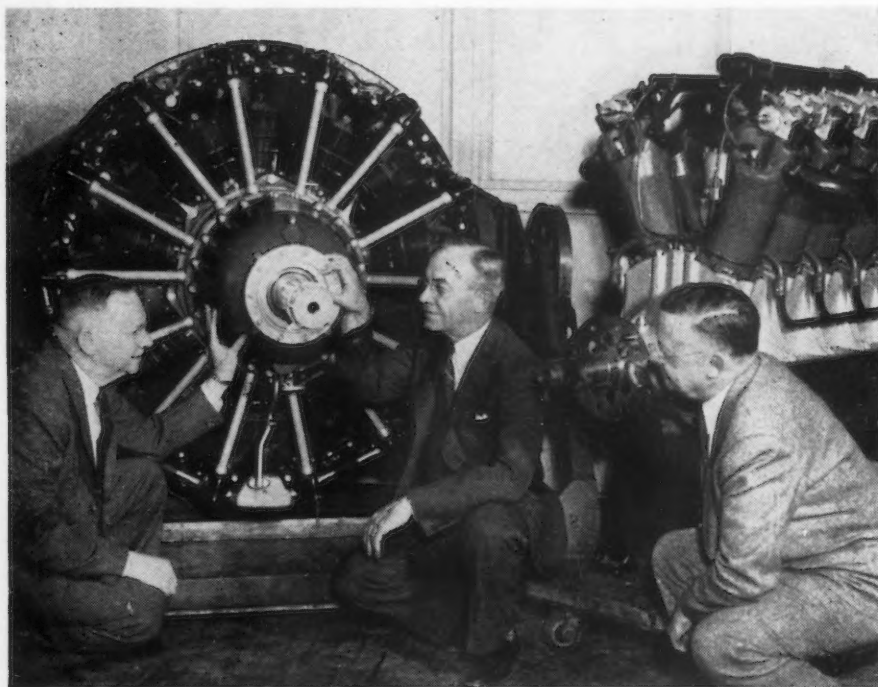
THESE precision gages are important factors in controlling fast moving production within close limits. This new circular, containing up-to-the-minute data on their use, is just off the press. A copy will be sent to any manufacturer requesting it on his company letterhead. Pratt & Whitney Adjustable Limit Snap Gages are saving many valuable hours by speeding up inspection.

WE have included in this same circular information on the new P&W Electrolimit Snap Gage which provides fast, dependable inspection on parts requiring extra close accuracy.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD, CONNECTICUT, U. S. A.





DURING WORLD WAR I, three engine experts helped build the famed Liberty airplane motor (right) in the Buick plant at Flint, Mich. Today they head the manufacturing organization Buick is assembling to build 5000 Pratt & Whitney engines (left). They are, J. C. Hammond (center), general manufacturing manager; I. H. Larkin (left), Hammond's assistant, and C. N. Ofield, chief inspector.

that are producing motor cars at the startling rate of 20,000 vehicles a day. Actually, aircraft production is more similar to shipbuilding in methods used and problems encountered."

Defense Work More Widely Spread

Widespread placement of defense work is shown in a recent compilation by General Motors Corp. which shows that 11 defense plants (only 11 out of the more than 35 corporation plants are doing defense work) buy materials from nearly 200 communities, large and small, scattered through 21 states.

In the newly published *Automotive Yearbook of Ward's Reports, Inc.*, it is shown that armament awards by the United States government to component plants of the automobile industry came to approximately \$1,500,000,000 during 1940. Orders of \$100,000 or more were shown to have been spread among 89 companies in the industry. In addition, it was pointed out that many millions of dollars in sub-contracts have also

been spread among these plants. Construction and expansion started by 58 companies of the industry during 1940 was estimated as involving \$80,000,000.

A mystery of the week is the question whether Chevrolet will build one of the big air-cooled airplane motors. Chevrolet engineers and buyers began getting telephone calls a week or so ago from important vendors who wanted to make appointments to talk with them about the new project. If there is such a project, it is purely in the negotiation stage, according to Chevrolet men, since they have received no instructions. However, Chevrolet is one of the few major groups in the automobile industry that does not have a defense project on the books.

Among relatively recent additions to defense work in the automobile industry is the placing of some Pratt & Whitney aircraft engine parts with Nash for machining.

An unexpected shortage is reported to be developing in supplies

of chlorinated solvents for vapor degreasing. As a result there is considerable interest in a new degreasing and cleaning material called Kolene, manufactured by Kolene Corp., largely out of by-products which are available in large quantities, it is reported.

Industry Buying Farther Ahead

With hand-to-mouth buying entirely out of the picture, there is a noticeable trend in this month's report of the Purchasing Agents Association of Detroit toward buying on a six-months' basis. Fewer industrial purchasing agents are finding it possible to buy on the three-months' basis which was in effect in many plants during the spring months. Three-months' buying has decreased, according to the purchasing agents' survey for April from 34 per cent to 29 per cent of the total, while six-months' buying has increased from 39 per cent to 43 per cent. Buying on a nine-months' basis continues at 18 per cent, and buying on a one-year basis is now being practiced by 3 per cent, compared with 1 per cent in January, February and March.

There is reported, however, an inclination on the part of vendors to the automotive trade to limit price commitments to a 30- or 60-day basis whenever possible. They are unwilling to commit themselves on a price basis for 1942 requirements, as is being urged on them by some of the major buyers.

Now that the industry is operating on a fixed production quota for 1942 models, the buyers are more than ever before anxious to get all of their necessary supplies "sewed up" for the entire model year. So far, there is no evidence that they have been successful.

Output Trend Upward

Continuing an acceleration in its production, the automobile industry has turned out in the past week 132,380 passenger cars and trucks compared with 130,610 in the previous week, according to Ward's Reports, Inc. The level is 30,000 to 40,000 units a week above the level attained last spring at this time; for instance, last year in the week ended May 10 assemblies were only 98,480 and the trend was downward.

LET YOUR SKILLED TOOL MAKERS DO MORE!

HOW much time are your skilled tool makers spending on the *maintenance* of tools? How many tools must they remake because of premature failures in service—or because something went wrong in heat treatment?

Each man-hour spent in the tool room on these jobs is a man-hour which can't be spent on getting new tools into service. Furthermore, each tool that comes back to the tool room represents a delay or interruption in plant production, a reduction in the output capacity of your plant.

By providing your tool makers with more factual information on the behavior of tool steels in the tool room, in hardening, and in service, you can help them give you *better* tools that need less attention.

There is a Carpenter Program that is helping industry do this. It is based on facts, down in black and white, organized and simplified for speedy use. It covers tool steel selection and heat treatment. It includes specific time-saving literature for executives, for skilled tool makers and hardeners, and for apprentice training courses. Find out about this helpful program. Write, on your company letterhead, for a free copy of "Spotlighting Hidden Plant Capacity." This booklet outlines the program in just 14 minutes reading time.



THE CARPENTER STEEL COMPANY READING, PA.



FREE
TO TOOL STEEL
USERS
IN U. S. A.

Carpenter
**MATCHED
TOOL STEELS**

WASHINGTON — A swing from the gun-and-butter theory heretofore proclaimed by leading New Deal economists has been under way for sometime. It was publicly set in full motion on Wednesday of last week in almost identical testimony before the House Committee on Ways and Means by Price Administrator Leon Henderson and Gov. Marriner S. Eccles of the Federal Reserve Board. Because of the similarity of their testimony, some members of the committee think that it reflects the Administration view on the \$3,600,000,000 defense taxation program more fully than does the Treasury plan.

Complete recognition was given to the fact that the defense program has entered upon a phase where steel, alloys, and other materials are being definitely rationed. Priorities, the critical list or preference ratings are subtracting supplies for the civilian market. The hump of defense demand has been approached by difficult passage through bottlenecks. The concentration of demand, plus loss of production by strikes, developed an inevitable temporary strain even on an industry with such great capacity as steel. This condition has forced abandonment of the earlier advocacy of some New Deal economists that expansion could and should be built up so rapidly as to assure full demand for both civilian and defense needs. The family should, as usual, have a new automobile and a new radio whenever it wanted them. The housewife should, as usual, have a new refrigerator whenever she wanted it. Indeed, with the employment and therefore purchasing power increasing these economists favored more, better and newer automobiles, radios, refrigerators, kitchen ranges, vacuum cleaners and what have you. The defense program was no reason to permit disturbance of the life-as-usual way or the more abundant life, even though the world is on fire, confronted by civilization-shaking catastrophe. Such was the philosophy of this group of forward thinkers.

Henderson-Eccles Testimony Realistic

But Mr. Henderson and Mr. Eccles have knocked that idea into a cocked hat. They were very realistic on this point in their testimony.

Taking the specific contention of Mr. Henderson, who said there is not enough steel capacity by a long shot, he went on record for taxation that would discourage "civilian consumption of those commodities which compete with military needs." To this end he struck at a vital spot, the automobile industry, the largest single consuming source of steel and metal



• Testimony by Henderson, Eccles shows New Deal trend away from "guns and butter" theory . . . Soon guns must come first . . . Household equipment, like automobiles, may be next in line for curtailment.

alloys. Mr. Henderson would abruptly increase the excise tax on automobiles from 3½ per cent to 20 per cent. The Treasury's proposal to double the tax at 7 per cent was shunned as being insufficient to choke off civilian purchase of automobiles, and therefore the conservation of steel and other metals for diversion to defense uses would be inadequate. More than that, Mr. Henderson would slap the 20 per cent excise tax on used cars.

This is an outstanding instance of emphasizing guns more and butter less. But production of refrigerators, radios, vacuum cleaners, kitchen ranges and other necessities and conveniences also would be sharply disrupted and their materials shipped to defense output.

The automobile industry is faced with attacks on two fronts:

The 20.15 per cent reduction program and this is only an initial slash; and the proposed high tax program. Incidentally the Henderson proposal for high taxation on consumers' durable goods in order to divert and increase defense production volume largely parallels a suggestion made about one year ago before the Army War College by Judge Jerome Frank, then a member of the Securities and Exchange Commission.

Inventory Control Weapon Ready for Use

To those who belittle the importance of reducing automobile output by saying the manufacturers will lay in large stocks of steel and other supplies before Aug. 1, when the reduction program becomes applicable, attention is directed to the recent announcement on inventory control by OPM Director of Priorities E. R. Stettinius, Jr. He said very clearly that both suppliers and consumers of 16 metals, including iron and steel, will be required to reduce shipments to overstocked customers and file sworn compliance statements. Thus if the OPM considered that any automobile manufacturer was purchasing excess stocks of steel or other metal included in the inventory control it could crack down and stop shipments. There also are powers to commandeer stocks, drastic action that certainly is not in contemplation at this time. But the club lies conveniently on the shelf.

The gun days have arrived. The butter days still are here also. But butter is going to become more difficult to get under the system of rationing by taxation and reduction in supplies if they are supplies made of defense materials. As to supplies not competitive with defense needs, Mr. Henderson would expand output for civilian use.

Leon Henderson, White House economic adviser and administrator of the powerful Office of Price Admin-

From stock to dock!

When it comes to bottlenecks these days our experience proves that the shipping department is the place that takes a real beating. Pictures here show how stock can move quickly from storage to trucks without congestion.

The extreme flexibility of American Mono-Rail equipment enables engineers to design such a system, related throughout the plant yet providing constant individual service at each process.

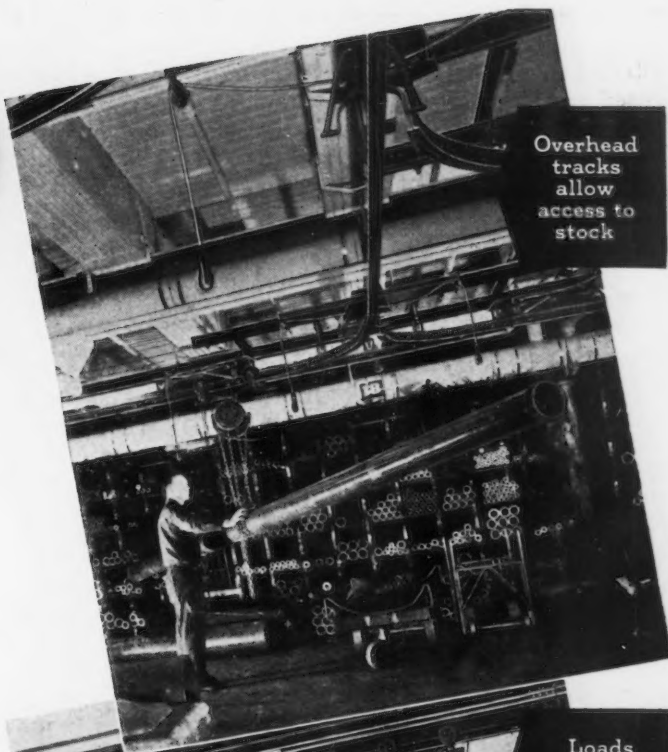
American MonoRail engineers, located in every industrial center, will gladly suggest from their wide experience a solution to your particular problem.

*Write for copy of Blue Book
illustrating hundreds of over-
head monorail installations.*

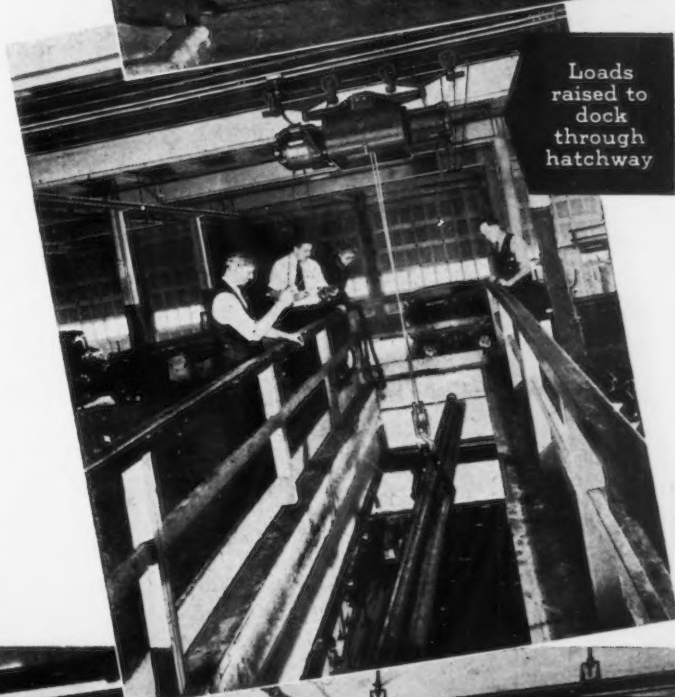
The American MonoRail Co.

13103 Athens Ave.

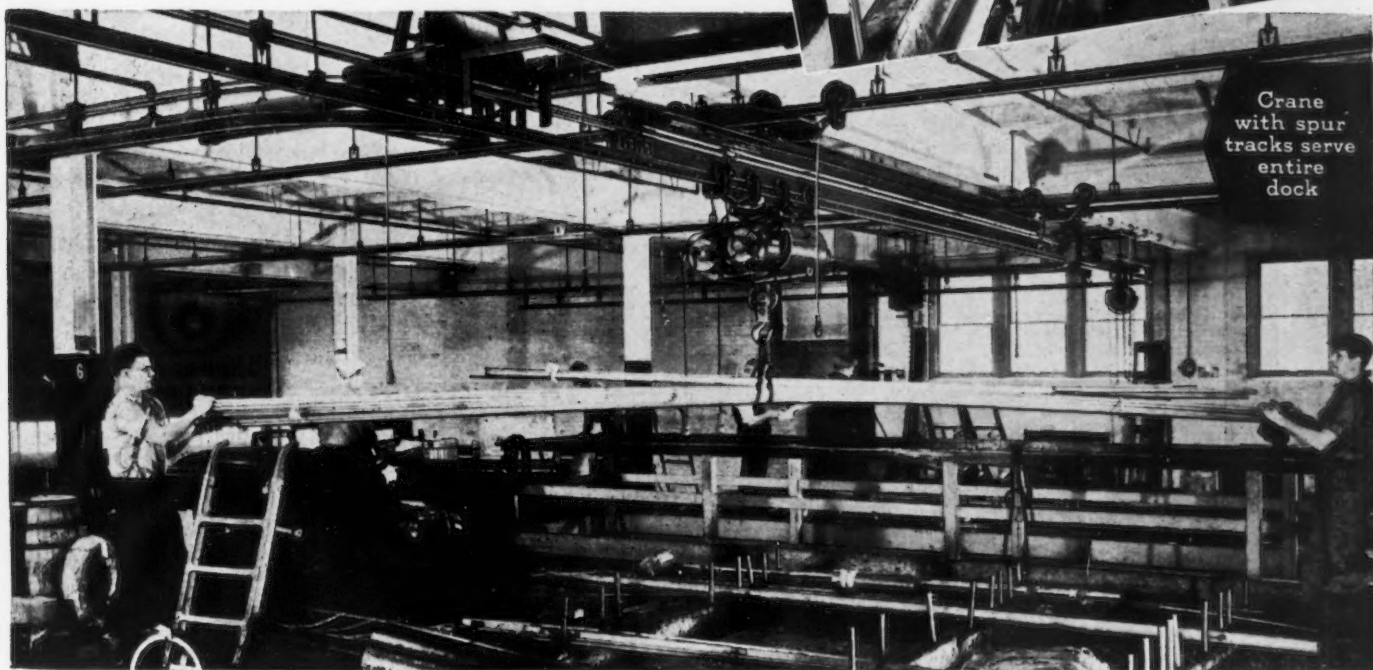
Cleveland, Ohio



Overhead
tracks
allow
access to
stock



Loads
raised to
dock
through
hatchway



Crane
with spur
tracks serve
entire
dock

istration and Civilian Supply, proposed to the House Ways and Means Committee last week that the excess profits tax be made "one of the main pillars" of the new tax program, but that a broad exemption be granted to companies whose income is less than \$25,000.

Medium-sized companies, it was suggested by Mr. Henderson, could be given the option of paying the tax or of showing their undistributed profits as taxable income of their stockholders. Under his proposal practically all of the revenue from excess profits tax would come from large companies.

The Price Administrator proposed an excise tax of 20 per cent on automobiles and drastic taxes on mechanical refrigerators, washing machines and other products described as "competing with defense production" for men, materials and machines.

Mr. Henderson, whose excess profits tax recommendations before the committee were concurred in by Marriner S. Eccles, chairman of the Federal Reserve System, conceded his program would fall short of constituting an ideal tax structure, but was positive in his asser-

tion that they would be "in keeping with total defense and the principle of ability to pay."

The Administration's price spokesman estimated that due to "the sheer compulsion of events," defense spending by May, 1942, will reach a rate of two billion dollars a month.



• • • Overlapping functions of OPM's division of priorities and the new OPACS will be the subject of coordination plans to be worked out by Assistant Director of Priorities Blackwell Smith and Joseph Weiner, assistant administrator of OPACS.

Because the executive order creating OPACS stipulated that priorities control so far as it was to be exercised over civilian supplies be handled by the new price administrator, speculation developed over the scope of priorities control to be taken over by OPACS. Both Price Administrator Leon Henderson and Director of Priorities Edward R. Stettinius, Jr., have denied there are any differences of opinion on policies and objectives.



Photo by Harris & Ewing

CALLING FOR CONVOYS: Secretary of War Henry L. Stimson, who last week appealed for more and still more aid to Britain, regardless of the risk, is pictured on his way to a War Cabinet meeting at the White House.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Center of Steel Gravity Near Paradise Hill, O.

• • • About eight miles northeast of Mansfield, Ohio, near the tiny settlements of Olivesburg (pop. 50) and Paradise Hill (pop. 10) lies the geographic center of the nation's steel industry, as determined recently by the American Iron and Steel Institute.

Around that point, which is the "center of gravity" of the steel industry, capacity for producing steel is evenly distributed on the "tons times miles" basis of figuring.

Inventory Control Is "Mild"—Stettinius

Washington

• • • E. R. Stettinius, Jr., Director of Priorities, has announced that Laurence J. Martin has been added to the executive staff to take over the job of handling the new metal inventory regulations announced May 1.

Mr. Martin is on leave from his post as assistant to the president of Thomas A. Edison, Inc., Orange, N. J. Inquiries relating to the inventory regulations should be addressed to Mr. Martin at Room 3349, New Social Security Building, Washington.

Following the announcement of Mr. Martin's appointment, he and Mr. Stettinius issued a joint statement asking American businessmen to give their "fullest cooperation" in working out the problems arising in connection with inventory control. Their statement said:

"The form of inventory regulation now imposed on 16 metals and classes of metals is a mild one and depends, for success, on the fullest cooperation from all concerned.

"We believe that no amount of law, no amount of auditing or field inspection, no potential penalties can possibly take the place of industry-wide cooperation, freely and willingly given.

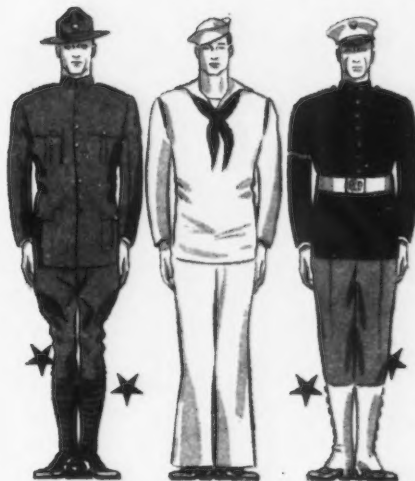
"The only purpose of the inventory regulations is to make the metals affected available in quantities as large as possible for defense purposes.

"To accumulate industrial inventories to a point higher than that necessary to meet required deliveries efficiently, is an act which, in the light of the shortages which exist, is definitely against the national interests.

"Between these alternatives—aiding defense or not aiding it—there can be no question as to which one industry will adopt. But this will take active rather than passive cooperation to make sure that the system works smoothly.

When the new inventory regulations were announced, it was pointed out that if the present mild controls were not successful, other steps would have to be taken to make sure that the metals affected were made available for defense needs before all other needs.

Prepare For INSPECTION

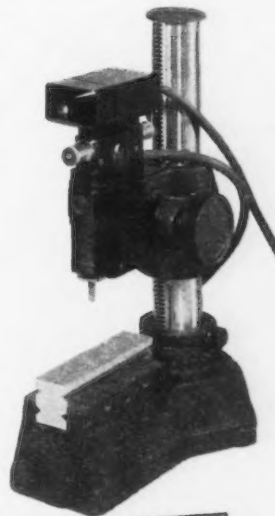


The Sheffield Electricgag has eliminated the bottleneck of slow, tedious dimension checking in many inspection departments because it flashes its answer instantly—just as fast as the work pieces are presented. If the signal light flashes amber the part being gaged is within specified tolerances. Green shows oversize, red undersize.

The accuracy of this gage is .000010" at any tolerance. It can be set for tolerances from .012" to .000050".

The Electricgag is flexible, consisting of a gaging head, light unit and base. The three elements may be used in one assembly for inspection department work or for checking purchased parts on arrival. The gaging head may be mounted on a machine to check parts in the process of manufacture while still on the machine. In such use the light unit may be assembled with the gaging head or with other light units at some location which would permit the control of several machines by one man.

Write for information about the wide use of the Sheffield Electricgag.



SHEFFIELD

GAGE CORPORATION • DAYTON, OHIO, U.S.A.

MASTER GAGEMAKERS

ON THE WEST COAST

SAN FRANCISCO.—Although private steel users have been told to restrict their demand for steel, no indication has been given by the government of intentions to curtail its wide-spread reclamation and flood control projects in the far Western part of the country.

In the years B. D. (before defense), these projects constituted the chief market for construction steel in the West. Although the tonnages required for this type of work are not large compared to the demands of industry, and are minute alongside defense demands, they nevertheless are using steel capacity which could be put to defense uses with some shifting of rolling equipment. The portion of this reclamation and flood control steel which is hauled from the East further complicates the already serious cargo space situation.

Contracts recently have been let by the United States Engineers' Office at Los Angeles for flood control work on the Los Angeles River which will require 7500 tons of steel. Although 5245 tons is reinforcing steel, which presumably will be rolled on the Coast, the balance of the tonnage will be thrust upon already glutted Eastern mills, and the delivery will require cargo space which could be used to speed already tardy deliveries.

Bids In June On Santa Fe Dam

The plea cannot be made that new construction involves only projects which already have been partly completed. Bids will be opened June 9 for the construction of Santa Fe Dam in southern California. This dam will require 5700 tons of reinforcing steel and 1425 tons of miscellaneous metal work. Although this dam is part of a broad flood control plan, it constitutes a separate unit in itself.

The above projects are only examples of many which would have a hard time proving their necessity to defense, but which are slated for construction nevertheless. Some of the larger government projects in-

• Non-defense government projects on Coast continue although private steel users must restrict their demand for steel . . . Dwindling ship space from East troubles steel men . . . Southern California plane plants reported short of engines.

volve the construction of power generating facilities, and could be justified on that basis, but the examples cited have no power angle, and there are many others like them which are being pushed ahead.

The tonnage involved is not a major factor, but some resentment is beginning to show in that everyone else is giving up something for Uncle Sam's defense but Uncle Sam himself.

Shasta Dam One-Sixth Complete

The Bureau of Reclamation does not come in for as much criticism as some of the other government agencies, partly because its chief projects involve power generating facilities, and partly because these projects, such as Shasta Dam, have passed the chief steel buying stages. The millionth cubic yard of concrete was poured into Shasta Dam last week, marking completion of one-sixth of the construction job on the huge key unit of the Central Valley project. Most of the heavy steel for this project has already been ordered, and a great deal of it is already fabricated and erected.

In the cast iron pipe category, some communities have pushed ahead their programs months or years, so that their orders go on the books at the same time as those for new lines required for cantonment, airport, and other military projects. Individuals are not the

only ones who have created this wild sellers' market. If private demand is to be held back to facilitate defense production now, and to provide a cushion after the war boom dwindles to an echo, it would seem that some attention could logically be given to the activities of governmental units and agencies.

Stream of Witnesses Against Bridges

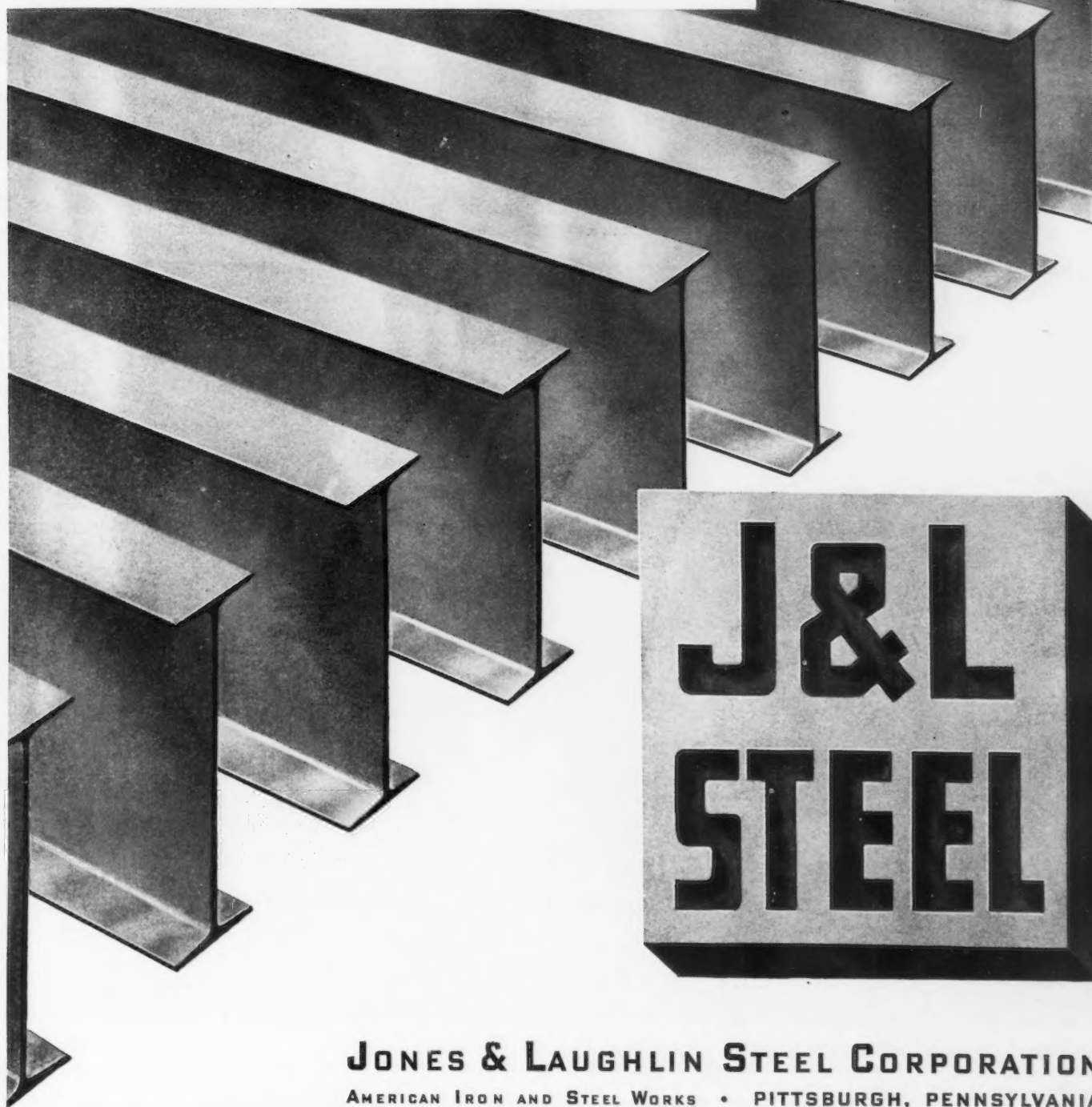
No indication of the outcome of the current Harry Bridges deportation trial at San Francisco can be derived from testimony given during the first three weeks. The government, in its efforts to prove Bridges a Communist, has called a steady stream of witnesses. One after the other, they have placed at Bridges Communist party secret meetings, faction meetings, intimate closed huddles, state conventions, a New York mass meeting under Communist control and order, and even in a round table huddle at San Francisco Communist headquarters. The apparent weakness in this testimony, as in testimony given at Bridges' 1939 hearing, lies in the background and character of the witnesses who have given this testimony. Most of them have been former Communists who took up the Red cause as a good meal ticket rather than from conviction, and whose word that Bridges is or was a Communist is not much, if any, better than Bridges' denial. Whether or not Bridges is deported will depend largely upon the value given this testimony by the court. The suggestion that a general strike of CIO workers all over the United States would ensue if the decision goes against Bridges is discounted generally in San Francisco.

Cargo Space Dwindles Steadily

Coast steel men are increasingly apprehensive over the prospect of dwindling cargo space for shipments from the East and Gulf Coasts. On some all-rail shipments freight charges constitute as much as 28 per cent of the published delivered price on the Coast. This

CONTROLLED QUALITY JUNIOR BEAMS

Strong—economical—light-weight steel I-Beams for reducing dead load in floors and roofs of factories, hangars, cantonment buildings, housing projects and other light-occupancy structures.



JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PENNSYLVANIA

THE IRON AGE, May 15, 1941—77

is a proportion too high for absorption, and some mills would be forced to abandon the Coast as a market if they were unable to pass on at least part of the freight charges.

By and large, Coast steel consumers are satisfied that they are getting good treatment on deliveries as users in other parts of the country, and are regarding long waits for material as inevitable.

Southern California aircraft plants are reported to be postponing hirings originally planned for May because of shortage of engines and certain materials.

Shipbuilding progress on the West Coast is generally very good, and favorable weather is enabling faster construction of yards. Of the 764 merchant vessels building or under contract in the United States, 261 or about 35 per cent are being built on the Pacific Coast. This West Coast construction will total 2,787,591 dead weight tons and will cost approximately \$540,000,000. Of this Pacific Coast program

177 ships are to be built in California yards.

CIO Warehouse Strike Settled

Tonnage passing through Pacific Coast ports continues to increase rapidly as more and more vessels "turn around" there instead of continuing through the Panama Canal to Gulf and Eastern ports. Los Angeles-Long Beach Harbor set a new foreign trade record during April. Forty-five Dutch steamers which now ply between United States East Coast ports and the East Indies henceforth will terminate their run at Pacific Coast ports, Dr. Alexander Loudon, Netherlands Minister to the United States, said in an interview at Portland, Ore., last week.

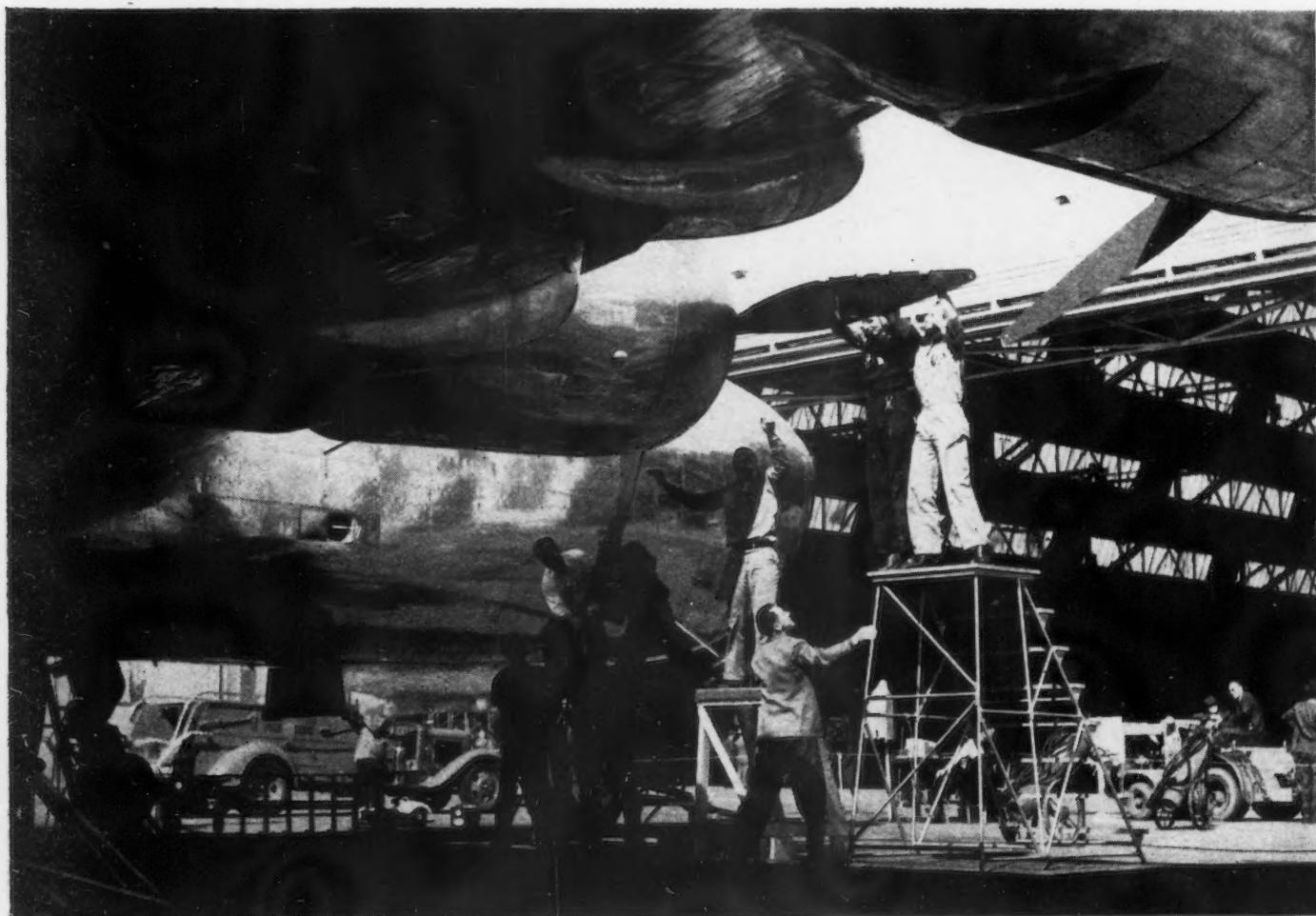
A strike of two weeks by 18 CIO warehousemen which closed the California Wire Cloth Co. plant at Oakland, Cal., was settled last week.

What may prove to be gathering storm clouds developed at Los Angeles where CIO demands on North American Aviation, Inc.,

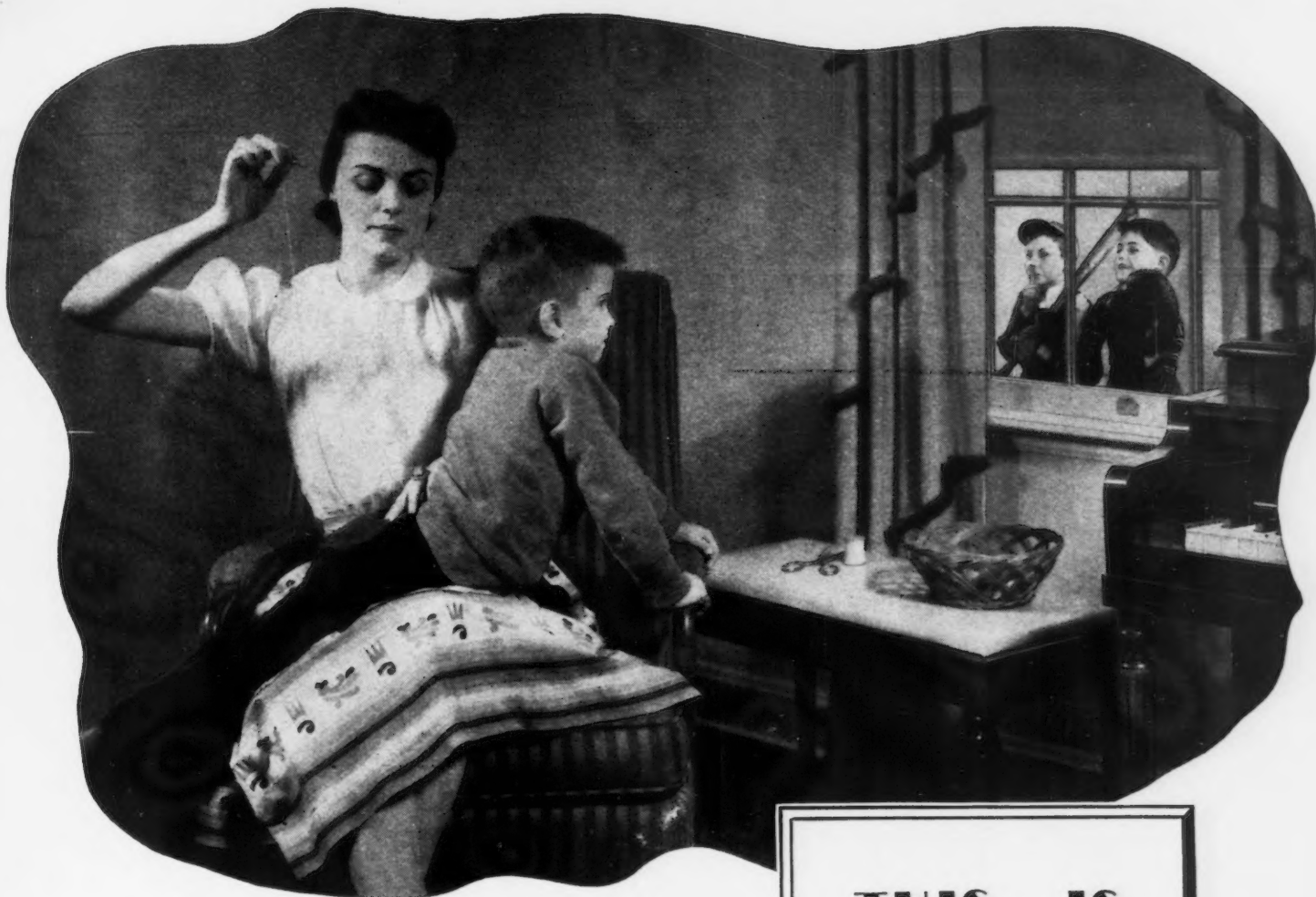
were termed excessive by President John H. Jouett of the Aeronautical Chamber of Commerce. Jouett said a study of the union proposals shows "the CIO has chosen to make extravagant demands on one of the most vitally important airplane manufacturing plants in the nation." The union asks a beginners rate of 75c. per hour compared to 52 to 55 in other plants. Other CIO contracts provide for an average of 57c. per hour after an average period of 78 days' employment through automatic raises, but the CIO is demanding 85c. after 30 days at North American.

"Defense production always suffers . . . because of the unrest and excitement occasioned by the threat of strike," Jouett said, indicating that the situation was serious.

"If appears that the cause of national defense production, as well as the individual welfare of the workers would suffer less if unions would make sincere and reasonable demands at the outset of negotiations," Jouett commented.



MOST PHOTOGRAPHED of all airplanes is this giant Douglas bomber. Some of its vital statistics: Four 2000 hp. Wright Duplex-Cyclone engines, 17-ft. propellers, 11,000 gal. fuel capacity, 7750 miles flying range. (Mechanics servicing the motors can stand upright within the wing).

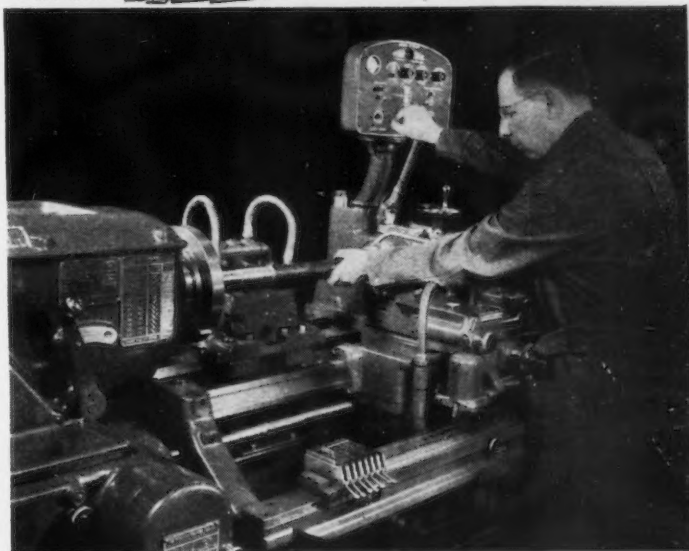


**THIS IS
NO TIME
FOR
A PATCH!**

YEARs of hand-to-mouth buying of machine tool equipment have crippled American Industry at a time when speed and production are sorely needed. Many a manufacturer is gambling his reputation on a patched-up production line because he failed to replace obsolete equipment when he had the opportunity. Now, he faces a future of heavy demand — and still lacks modern instruments of production.

Monarch designs and builds lathes for tomorrow's production needs — lathes that make it possible to meet tomorrow's competition on an equal and profitable basis. The Monarch Machine Tool Company, Sidney, Ohio.

A Monarch *Magna-Matic* The all-electrically controlled Automatic Lathe.



MONARCH LATHES

Fatigue Cracks

BY A.H.DIX

Speaking of Bores

• • • The brains department has been in a pother lately about the proper way of designating the caliber of guns, shells and cartridges. Should it be 50 cal. or .50 cal.?

The decision will probably be to let the decimal point in, for Frank Oliver, our ordnance expert, points out that while caliber with the decimal point simply means that many hundredths of an inch, it means something entirely different without the decimal point. When the Navy, for example, speaks of a 16 in. 40 cal. gun it means a gun that fires a 16-in. shell, and with a barrel 40 times the shell diameter, or 53.3 ft. in length.

Plate the Enemy

• • • The newspapers, too, are having their troubles with ordnance terminology. The other day the New York *World-Telegram* mentioned a .37 mm. gun. As a millimeter is about 1/25th of an inch that would be a gun with a bore less than .015 in. diameter. A metal spray gun would fit into this classification nicely, but of course the fighting would have to be done at close quarters, say 1½ feet.

Ess Eschewers

We also learned that it is fashionable in Army circles to drop the "s" in speaking of shells. If you are among the initiate you say, for instance, "15,000 shell a day." Professionals have little patience with plurals. Ask a carpenter how much lumber he will need for a certain job and he'll answer, "She'll run about 200 foot."

"Puddler Jim" Balks

• • • Your practically infallible Washington eyes and ears, Leon Wesley (see page 72) Moffett, has slipped a cog at last, it does not pain us to report. The other day he referred to the U. S. senator from Pennsylvania as "Senator James A. Davis, Democrat, of Pennsylvania," bringing us a letter from the Senator, reminding us that his middle initial is still "J," that he is still a Republican, and adding pleasantly:

"During my tenure as Secretary of Labor I received *The Iron Age* regularly and kept it on my desk for reference, as it kept me up to date on a number of things."

Aptronyms

We see that S. S. White Dental Mfg. Co.'s metallurgist is W. C. Drill.

And Oliver Johnson, our research chief, informs us that David Bradley Mfg. Co.'s industrial engineer is fittingly named C. L. Fix.

But it saddens us that a certain General Electric mechanical engineer isn't in the X-ray equipment division. His name is J. Flaws, Jr.

Three in One

• • • We like to keep you in touch with the special "weeks" and "days." The week before last was *Baby Week*. It is now too late to do anything about that, but this is *Bottled Carbonated Beverage Week*. It is also *Raisin Week* and likewise *Mother and Daughter Week*. You can honor all three at one swoop by buying a raisin cake, a bottle of club soda and a fifth of Scotch, giving the first to your mother and the second to your daughter.

Add One and Beat the Law

• • • Our Louisville correspondent, Norvin E. Green, president of the Louisville Car Wheel & Railway Supply Co., took time off on Derby Day to write us that we are correct in assuming nine pins are set up in the form of a diamond. He also tells us how ten pins, the present game, originated:

Nine pins became such a rage that people began neglecting their work to play it. So legislation was enacted restricting play to certain hours. This cut into the profits of the inns in which the game was played. Someone, probably a Philadelphia lawyer hired by the Atlantic Seaboard Ninepin League, which was really a front for the alley and inn interests, suggested that the law could be beaten by adding a pin. The pins were set up in triangular form, and that's how ten pins were born.

Etymological Hermits

• • • We are perpetually popeyed over the trouble that word inventors have gone to to coin words describing rare and highly specialized conditions. If, for example, you hear a noise that resembles the sound made by blowing across the top of a bottle, you don't have to say, "That sounds as if someone were blowing across the top of a bottle." You simply say, "That sounds amphoric." This has only two disadvantages: (1) you can never remember the word, and (2) if you can, no one knows what you are talking about.

One favorite trick word is the one that applies to a person who is afraid of No. 13. He is a triskaidekaphobe. But even if you can remember it, it is safer not to say it as it sounds like the case of Mr. X of Stuttgart in 'Krafft-Ebing, and the 13-fearer might get the wrong idea.

However, there are times when a trick word helps. Say, for instance, your wife's brother is a loafer and it would hurt her if you said bluntly, "Your brother Louie is a bum." Instead you say, "Louie is an ergasiophobe," a pretty word meaning a person who has a morbid horror of work. This has a harmless sound, and gives the impression that it is something a bottle of B. pills would cure.

Editorial Booklet Ready Soon

Ordinarily I do not write fan letters but your editorials have inspired me to write to you.

I always look ahead to reading your editorials. May I ask, do you expect to have these put in book form some day?

Will H. Coghill, Supervising Engineer,
U. S. Bureau of Mines, Tuscaloosa, Ala.

The booklet of editorials by John H. Van Deventer, your favorite family journal's president and editor-in-chief, is now being printed and will be off the press by the time you read this. The booklet contains 30 of the latest editorials reproduced in full size, 8½ in. by 11 in., on heavy paper, 70 lb.

Twenty-five cents will cover the cost of a copy. If you want one or just a few copies will you kindly send stamps or coin, in order to avoid bookkeeping. But if you want a quantity we'll be glad to bill in the usual way. In writing to us at 100 E. 42nd St., New York City, just refer to it as the editorial booklet.

Musical Monickers

• • • The anonymous, omniscient "Deac" writes:

"I can't top you on street names, but out in Utah there is a schoolgirl named Laurel Meadows, which evokes pleasant images to a fisherman like me. And right in your own industry is a comely and suave receptionist named Duane Vallant, which I have already obtained rights on for my Great American Novel."

Pun

• • • No one can question British courage. The Reynolds Tube Co., Ltd., of Birmingham, England, headlines an ad in the English magazine *Aircraft Production*, "The Stature of Liberty."

Puzzles

• • • Last week's trotter ran 33 feet per second.

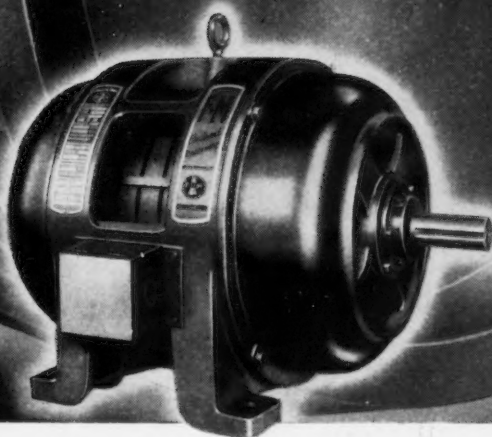
This problem is particularly timely now that Hank Greenberg has had to leave the Tigers flat-footed despite his second-degree bilateral pes planus:

If you were betting that you could name all the winners in the American League on a given day, what would be fair odds for you to demand?



Copperspun

PATENTED



Why Aren't ALL Motors Copperspun?

● It's an accepted fact that the one-piece rotor with windings centrifugally cast of SOLID COPPER makes the best squirrel-cage motor. For only in this rotor are the advantages of one-piece winding combined with the advantages of copper.*

Why, then, aren't Copperspun rotors used in *all* such motors? It's not because *only* Fairbanks-Morse has attempted to produce rotors of this type . . . the advantages are too widely recognized for that. It's because *only* Fairbanks-Morse has succeeded.

It took a great deal of time and money to find

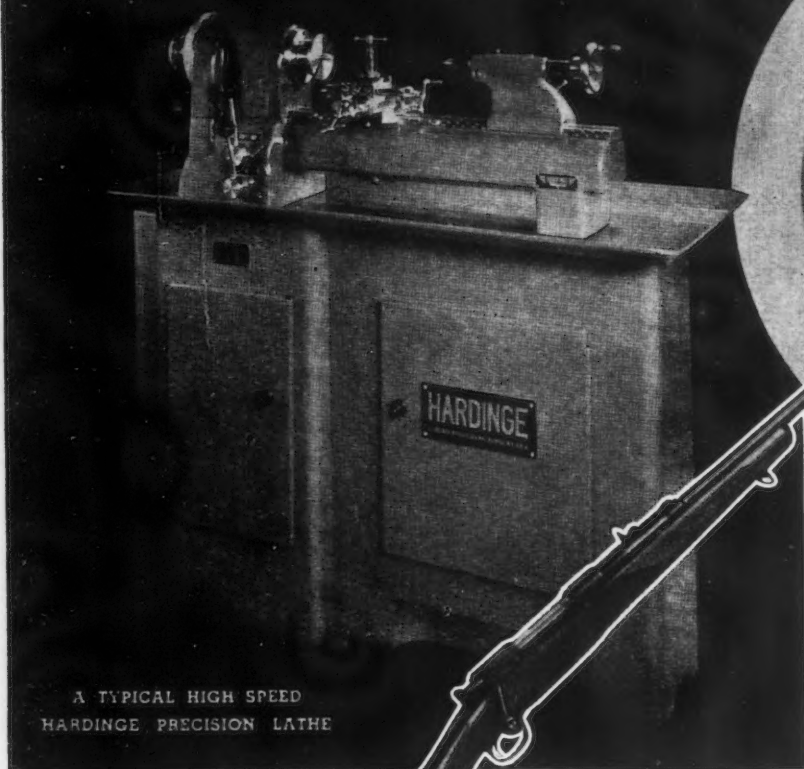
and perfect practical means of commercial production. But the result is worth the cost . . . F-M Motors with patented features available only in Copperspun rotors can help reduce operating and production costs. Their plus values challenge investigation if you desire the most for your equipment dollar. Write Fairbanks, Morse & Co., Dept. E38, 600 S. Michigan Avenue, Chicago, Illinois. Branches and service stations throughout the United States and Canada.

*Copper has a high melting point (2000° F as compared with 1100° F for aluminum), higher electrical conductivity, and better thermal expansion characteristics.

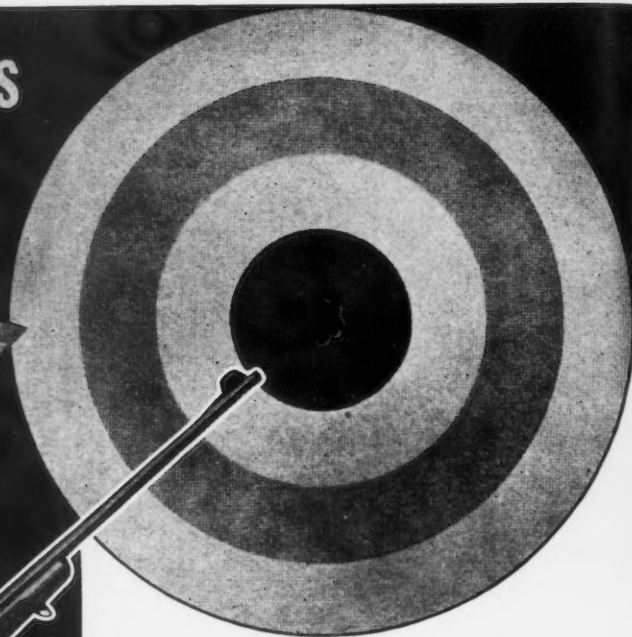
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hit the "Bulls Eye" for performance

The Winchester Repeating Arms Company have selected Hardinge modern machines to play an important part in their production program,

because . . .

the high quality, quick action and accuracy of all Winchester Arms, demanded the same characteristics in the machines used in their manufacture.

Ask for descriptive bulletins which present reasons why easy to operate, low cost Hardinge machines will serve you better in your laboratory, tool-room and production work.

HARDINGE BROTHERS, Inc.

ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

WINCHESTER MODEL 70
BOLT ACTION
REPEATING RIFLE

News of Industry



DAWN IN GEORGIA: This dramatic photograph shows a group of U. S. Army trucks (4 x 4 Chevrolets) rolling across a field at Fort Benning, Ga., more evidence of the growing strength of the nation's mechanized divisions.

Steel Industry Organizes To Aid Defense Program

••• Formal organization of the Iron and Steel Industry Defense Committee was completed at a meeting on May 7 at the Waldorf-Astoria Hotel, New York, which was attended by nearly 150 chief executives of iron and steel companies. Informal organization had been effected some weeks ago, but the go-ahead signal was the ruling recently set forth by Attorney General Robert H. Jackson that industry meetings with the Office of Production Management and the Office of Price Administration and Civilian Supply, or at the instigation of these government bodies, are not illegal.

Walter S. Tower, president of the American Iron and Steel Institute, who is also serving the government as a \$1 a year man on the Iron and Steel Priorities Committee, presided at the meeting,

which selected a committee of 38 executives of iron and steel companies to work with the OPM in mobilizing for national defense all of the facilities of the industry.

An executive committee was also selected consisting of B. F. Fairless, president, United States Steel Corp.; E. G. Grace, president, Bethlehem Steel Co.; T. M. Girdler, chairman, Republic Steel Corp.; Henry A. Roemer, chairman, Sharon Steel Corp.; W. F. Detwiler, chairman, Allegheny Ludlum Steel Corp.; F. R. Frost, president, Superior Steel Corp.; E. L. Parker, president, Columbia Steel & Shafting Co.

The 38 members of the Iron and Steel Industry Defense Committee are as follows:

T. R. Akin, president, Laclede Steel Co., St. Louis. A. K. Andrews, president, Andrews Steel Co., Newport, Ky. S. E. Bramer, president, Copperweld Steel Co., Glassport, Pa. W. F. Detwiler, chairman, Allegheny Ludlum Steel Corp., Brackenridge, Pa. B. F. Fairless, president, United States

Steel Corp., Pittsburgh. F. R. Frost, president, Superior Steel Corp., Pittsburgh. T. M. Girdler, chairman, Republic Steel Corp., Cleveland. E. G. Grace, president, Bethlehem Steel Co., Bethlehem, Pa. W. W. Holloway, chairman, Wheeling Steel Corp., Wheeling, W. Va. C. R. Hook, president, American Rolling Mill, Middletown, Ohio. J. P. Hosack, vice-president, Mahoning Valley Steel Co., Niles, Ohio. Elton Hoyt, 2nd, Pickands, Mather & Co., Cleveland. F. B. Hufnagel, chairman, Crucible Steel Co. of America, New York. E. J. Kulas, president, Otis Steel Co., Cleveland. H. E. Lewis, chairman, Jones & Laughlin Steel Corp., Pittsburgh. Roy McKenna, president, Vanadium Alloys Steel Co., Latrobe, Pa. Hugh Morrow, president, Sloss-Sheffield Steel & Iron Co., Birmingham. H. Niedringhaus, president, Granite City Steel Company, Granite City, Ill. E. L. Parker, president, Columbia Steel & Shafting Co., Pittsburgh. J. H. Parker, president, Carpenter Steel Co., Reading, Pa. J. L. Perry, president, Carnegie-Illinois Steel



STOCKHOLDERS AT LUNCH: Benjamin F. Fairless, Jr. (holding ham on rye), president of U. S. Steel Corp., and Irving S. Olds, chairman of the corporation, are shown at the recent annual meeting of U. S. Steel stockholders.

Corp., Pittsburgh. Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown. L. F. Rains, president, A. M. Byers Co., Pittsburgh. S. J. Reeves, vice-president, Reeves Steel & Mfg. Co., Dover, Ohio. Arthur Roeder, chairman, Colorado Fuel & Iron Corp., New York. H. A. Roemer, chairman, Sharon Steel Corp., Sharon, Pa. E. L. Ryerson, chairman, Inland Steel Co., Chicago. W. H. Sommer, president, Keystone Steel & Wire Co., Peoria, Ill. C. F. Stone, president, Atlantic Steel Co., Atlanta, Ga. W. S. Tower, president, American Iron and Steel Institute, New York. C. E. Tuttle, president, Rustless Iron & Steel Corp., Baltimore. Wilbert Wear, president, Harrisburg Steel Corp., Harrisburg, Pa. A. C. Weihl, Pollak Steel Co., Cincinnati. E. T. Weir, chairman, National Steel Corp., Pittsburgh. J. T. Whiting, president, Alan Wood Steel Co., Conshohocken, Pa. D. A. Williams, president, Continental Steel Corp., Kokomo, Ind. R. W. Wolcott, president, Lukens Steel Company, Coatesville, Pa. E. H. Worth, president, Worth Steel Co., Claymont, Del.

With the growing demands for the defense program, which are being superimposed on already overcrowded steel backlogs, much of which is for non-defense work, the duties of the Iron and Steel Industry Defense Committee will be to allocate to the various mills the various requirements of the Army, Navy and Maritime Commission.

Whether all steel products eventually come under mandatory priorities or not, the committee probably will be called upon to assist the OPM in distributing the orders for defense material to those mills which are best able to handle the orders expeditiously. Allocations that have recently been made for shipbuilding have been largely on the basis of the respective capacities of the various manufacturers.

Both the steel industry and the government authorities have sought to avoid mandatory priorities as long as possible, it being recognized that there will be an inevitable interference with efficient rolling practices unless the handling of priority orders is carried out with the full voluntary

cooperation of members of the industry. The imposition of an "all-out" priority system for steel will perhaps be avoided so long as the present voluntary system works satisfactorily.

Thus far strict priority control has been exercised only with respect to the nickel alloy steels, though a growing number of preference ratings for all types of steel is being issued. These orders are to some extent setting back deliveries of steel to ordinary commercial users.

Efforts of the committee will be directed toward seeing to it that the facilities of every steel plant are utilized to the full. Presumably this will mean that plants whose operations fall below full capacity for reasons other than necessary repairs will be supplied with orders either by direct allocation or by re-allocation of orders previously placed.

The chief problem facing steel companies is that of satisfying non-defense manufacturers whose orders are on the books while at the same time giving expeditious service to defense orders. Obviously defense orders must come first and it is equally obvious that scheduled deliveries for all other users will be subject to more frequent interruptions.

A further step by which the industry will assist the OPM is the appointment of a committee on commercial research by the American Iron and Steel Institute. This committee's work will include the study and analysis of steel requirements of various consuming industries under the defense program. The results of these studies will be made available to the OPM.

Members of the committee comprise the men in charge of analyzing commercial and market conditions for five of the leading steel companies. C. H. H. Weikel, manager of commercial research, Bethlehem Steel Co., is chairman. Other members are D. R. G. Cowan, manager of market research, Republic Steel Corp.; K. J. Evans, manager of sales promotion, Inland Steel Co.; K. G. Fuller, manager of market research, United States Steel Corp.; H. K. Weir, assistant secretary and assistant treasurer, National Steel Corp.

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"PULL" IS WHAT YOU PAY FOR AND "PULL" IS WHAT YOU GET

With "DV" Drives the sheaves and belts team up to pull the load without slip or lost power because they are of matched quality.

Drive performance is greatly dependent upon sheave quality. "DV" Sheaves are machined on the most modern equipment available. Groove dimensions are absolutely uniform so that belts seat properly and pull evenly. They are made of special close grained iron insuring against rough edges which would cut and tear the belt.

"DV" Belts have concave side walls to prevent bulging when flexing over the sheaves. This means perfect contact of belt with groove walls — no slippage—long belt life. Strength section of cords is in exact center of belt which prevents shifting during construction or curing and insures true running under all conditions. Heavy multiple-ply bias-cut fabric covering provides protection for cord members against destructive elements.

"DV" Drives are obtainable in a wide range of capacities from Dodge distributors in industrial centers.

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MISHAWAKA, INDIANA, U. S. A.



THE RIGHT DRIVE

FOR EVERY JOB

Why **MATCHED
QUALITY MEANS
BETTER PERFORMANCE**



Fig. 1

shows "DV" Belts with
concave side walls.



Fig. 2

shows the perfectly straight
surface formed by the belt
in contact with the groove
when flexing over a sheave.



Fig. 1

shows how belts seat in ac-
curately machined grooves
of uniform dimensions.
This means even "pull"
with no loafing belts.



Fig. 2

shows what happens when
groove dimensions are not
uniform.

An Ever Expanding Arsenal

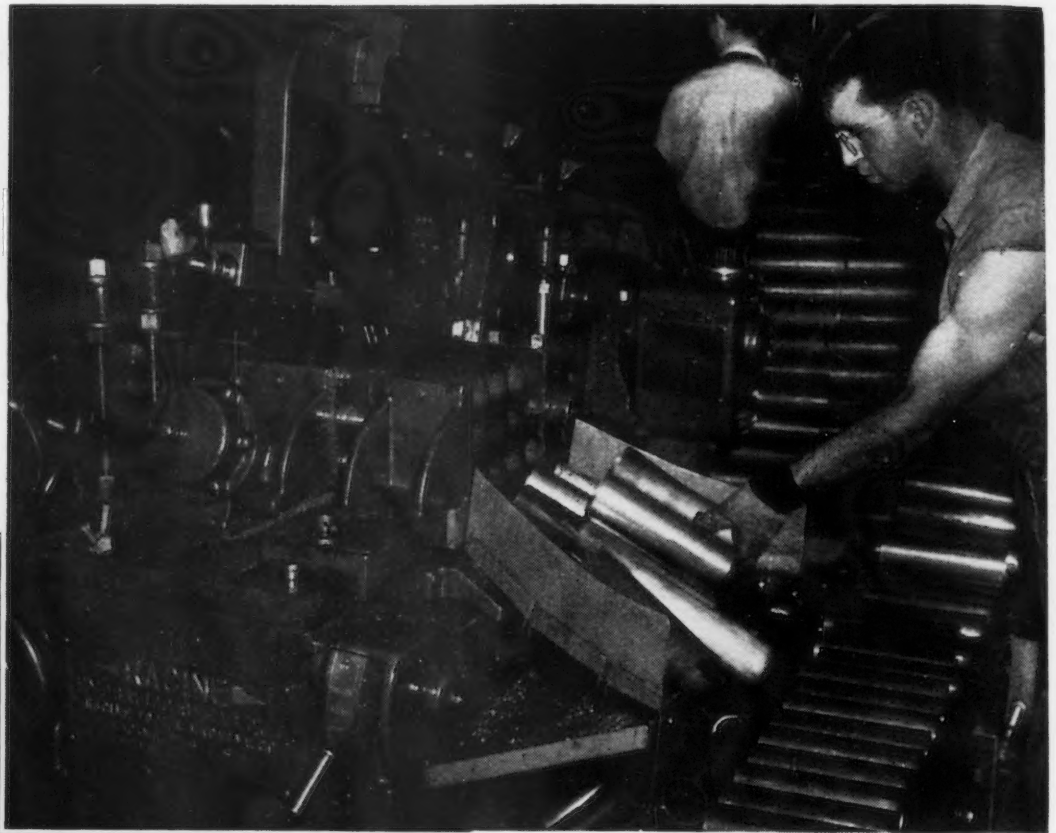
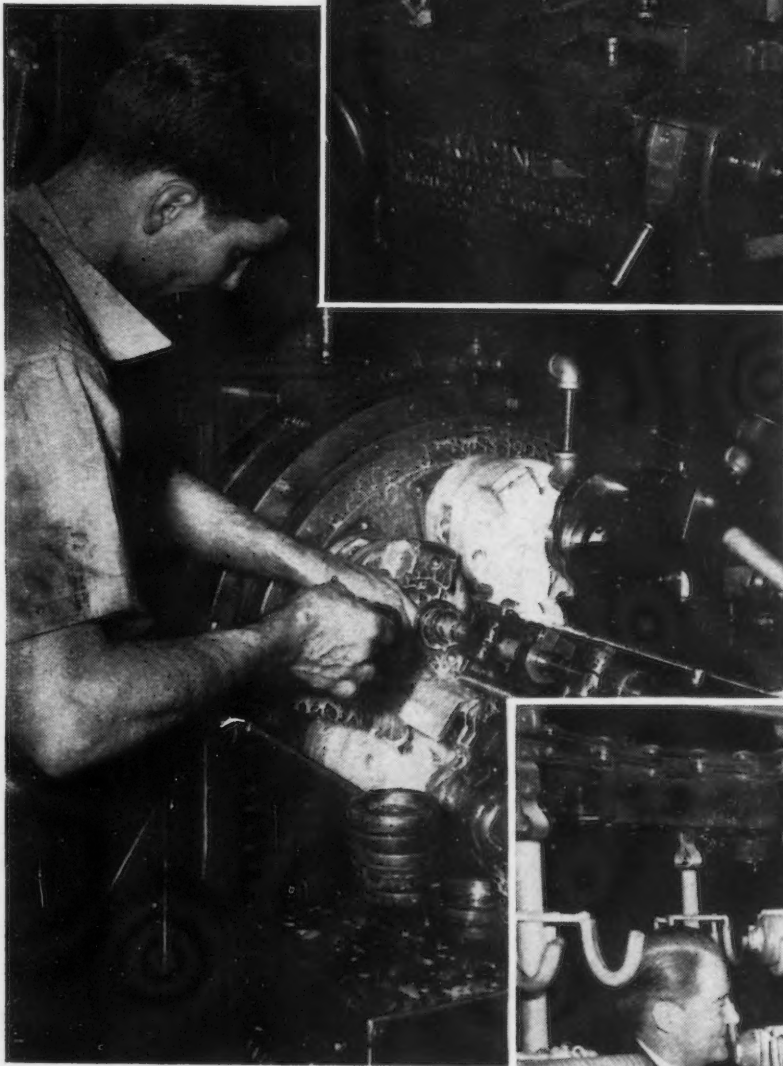


Photo by International



STREAMLINED BOMBS, in addition to streamlined trains, are being turned out by the Edward G. Budd Mfg. Co., Philadelphia. Examining some of the bombs, which hang about like sausages, are John D. Biggers, (lower l. to r), OPM Production Director; Edward G. Budd, president; Gen. Charles Harris, associate chief of U. S. Ordnance, and Miss Josephine Hass, bomb inspector. At the left is an automatic screw machine used in the Budd bomb production line. Above is a power hacksaw used for cutting off the tubing from which the bombs are formed.



HUNDREDS OF U. S. PLANTS like the Budd plant at Philadelphia have already made the jump from peace to wartime products. Within 100 days, Mr. Biggers declares, "these wonderfully efficient plants . . . will start to pour forth a Niagara of military products."

A.S.T.E. Finds Defense Training Improving

• • • Nation-wide reports from regional committee chairmen of the Emergency Defense Training Committee of the American Society of Tool Engineers, indicate material improvement in the status of training activities, according to O. W. Winter, national committee chairman. The technical society is cooperating with governmental and educational bodies and industry nationally and locally in attempting to improve the situation by advising or improving organization and direction of training programs.

In a few localities, rivalry between local bodies seeking domination of training programs is mitigating seriously against providing adequate facilities according to Mr. Winter.

Following are current reports from some of the major industrial sections:

BALTIMORE: All existing training facilities being used to the utmost and additional ones being provided according to John Buckley, Regional Chairman of the A.S.T.E. Committee. Opinion is that future needs will be extreme and that present needs are greater than the current shortage of 700 men reported by the State Employment Service.

BOSTON: A committee of educational authorities, government representatives, manufacturers' representatives, and A.S.T.E. members is being formed under the sponsorship of the A.S.T.E. to improve handling of the training program. According to J. B. Savits, Regional A.S.T.E. Chairman, the outlook for the future appears very promising although still uncertain.

CENTRAL PENNSYLVANIA: Training facilities being fully utilized and more being provided. Situation under complete control, with York particularly active.

CHICAGO: Situation uncertain.

CINCINNATI: New plant of Wright Aeronautical Corporation expected to create a bad labor shortage in the near future, in spite of the tremendous training activity being carried on, according to William Frederick, A.S.T.E. regional Chairman. Importation

of labor will probably have to continue.

CLEVELAND: Training activity extensive but probably inadequate for future requirements, according to Roy Bender, Cleveland A.S.T.E. Regional Chairman.

COLUMBUS: Current shortage of machinists and tool makers expected to get worse. A.S.T.E. "industry survey" not quite complete. Indications are that additional training facilities will be needed in addition to those already being fully utilized.

DAYTON: According to George Goodwin, A.S.T.E. Regional Chairman, training activity appears to be adequate in this area to meet industry's needs.

DETROIT: Situation still uncertain, partially due to lack of information of the extent to which automotive labor will be usable on defense work.

SAN FRANCISCO: Needs of industry decidedly in excess of training activity, according to Carl Horack, A.S.T.E. Regional Chairman.

GREATER NEW YORK: Considerable uncertainty both as to

300 Farm Boys Trained By Monarch Tool

Sidney, Ohio

• • • Establishment of large new defense plants in southern Ohio so far has not seriously affected the supply of machine shop trainees in the vicinity of this small town, according to W. E. Whipp, president, Monarch Machine Tool Co.

Around 300 farm youths have been trained as machine operators by Monarch since the first of this year. A large waiting list of applicants is held by the company.

The secret of quick and effective training is to have plenty of adequate supervision, says Mr. Whipp. In a few isolated cases trained youths have departed from Sidney to seek work in the new defense plants in nearby cities but invariably return here because of the high caliber of supervision which greatly assists the quality and quantity of their workmanship.

industry's future requirements and as to the availability of training facilities. Little success in or-

GROUND AID for airplanes. This is one of 16 1250-kw. electric generators just completed at the Westinghouse East Pittsburgh, Pa., works for an airplane manufacturer. These generators are used to "break in" airplane engines before they are placed in planes.



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ganizing cooperative effort reported.

HARTFORD, CONN.: Fred Woodcock of the A.S.T.E. reports training situation satisfactory.

INDIANAPOLIS: Politics apparently retarding effectiveness of training program. Most serious shortage is in the higher skilled occupations of machinists, tool makers, tool designers and tool engineers. Upgrading training to fill such shortages apparently inadequate.

NEW YORK - NEW JERSEY: According to Frank Oliver, regional A.S.T.E. committee member, industry's requirements will probably be tremendous in the near future. While there is considerable training activity, its adequacy is questionable.

PHILADELPHIA: Training program well organized and keyed to current and contemplated needs, due to early start with A.S.T.E. active in defense training.

PITTSBURGH: Situation uncertain. O.P.M.'s Training Within Industry Division, Chamber of Commerce and Board of Education cooperating with A.S.T.E. however.

SPRINGFIELD, MASS.: Situation uncertain, though some training activity is going on.

Curtiss-Wright Columbus Plant to Hire 1600 July 1

Columbus, Ohio

• • • Out of the estimated maximum of 13,000 employees which the new Curtiss-Wright aircraft plant here will require by October, 1942, approximately 7000 will come from outside this city. A concerted drive is under way by the Chamber of Commerce and other agencies to make fullest use of all present available housing facilities.

The plan, which includes establishment of a proposed housing bureau to list all available housing facilities in the community, would preclude the possibility of a "ghost village" or "white elephant" if a more or less temporary housing project is permitted.

Curtiss-Wright plans to build up its working force gradually month by month, beginning with 1600 on July 1 of this year.

Koppers United Announces Granite City Purchase

Pittsburgh

••• Koppers United Co. has announced that it has purchased two idle blast furnaces and two batteries of coke ovens from the Granite City Pig Iron Co., Granite City, Ill. The financial consideration was not stated.

The blast furnaces, of 500 and 600-ton capacities, have been shut down since 1932 and the two coke plant batteries, with a total of 80 ovens, have been idle since 1935.

Koppers United officials stated that the plant will be reconditioned and the first of the furnaces will be ready for production not later than July.

The first furnace is expected to produce about 200,000 tons of pig iron a year.

Decision by Koppers United to buy the Granite City furnaces closely followed a survey of the 16 unoperating blast furnaces in the nation by James G. West, of the staff of the steel unit in the production division of OPM. Of the 16 the two at Granite City were found to be in best condition for most immediate operation.

Majority of the pig iron production from the former Granite City pig iron plant will be supplied to nearby Granite City Steel Co., whose open hearth furnaces are only a mile from the Koppers blast furnaces. The metal will be trans-

ported in a molten state to the steel plant. The remainder of production will be supplied to other companies.

Steel Shipments in Steady Flow From British Mills

London

••• British steel mill activity is maintained at a high level, and makers have orders which guarantee a continuance of present conditions for virtually the whole of 1941. In some branches new business is rather less plentiful than hitherto, but there is no question of full production quotas not being taken up; rather this decline is the result of greater familiarity with the operation of the distribution plan, which tends to make the consuming branches less hasty to order ahead. It is also in part due to the knowledge of the satisfactory way in which deliveries have hitherto been made—thanks to the steady flow of raw materials.

Packard Electric Strike Ends

Warren, Ohio

••• Negotiators on Thursday, May 8, announced settlement of the labor controversy at the Packard Electric Division of General Motors Corp. here, which tied up production starting May 1.

ASTE Charters 43rd Chapter at Nashville

••• The forty-third chapter of the American Society of Tool Engineers was formed in Nashville, Tenn., April 25, with 42 charter members. Formation of this chapter is largely due to the rapid development recently of industry in this section in connection with the defense program. Leading the group of such industries in this area is Vultee Aircraft, Inc.

Officers elected were:

Chairman, H. T. Sprott, tool engineer, Phillips & Buttorff Mfg. Co.; vice-chairman, W. E. Clowminzer, chief of tool planning and control, Vultee Aircraft, Inc.; secretary, Leo V. Johnston, Sr., and L. V. Johnston Tool Co., and treasurer, Lawrence A. Platt, tool planning division, Vultee Aircraft, Inc.

New Rheem Plant Opens

Chicago

••• New plant of Rheem Mfg. Co. here is open after only 65 days of construction work. Firm's original plant will now be used exclusively for defense products of practice bombs and fins for demolition bombs; while new plant will be devoted to manufacture of regular line of products, including gas-water heaters, boilers and tanks.

EXCEPTIONAL BOMBS: One of the new bombs used in recent raids by British planes on German and German-occupied French ports is shown below. The 2000-lb. bomb is being loaded on a Whitley heavy bomber.

Photo by British-Combine

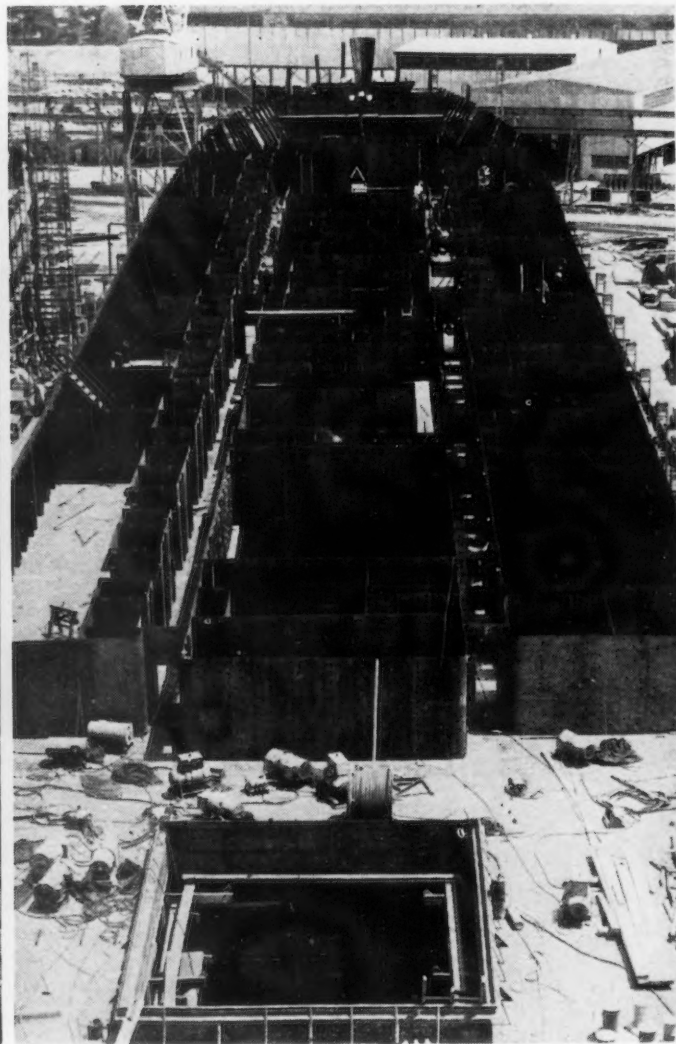
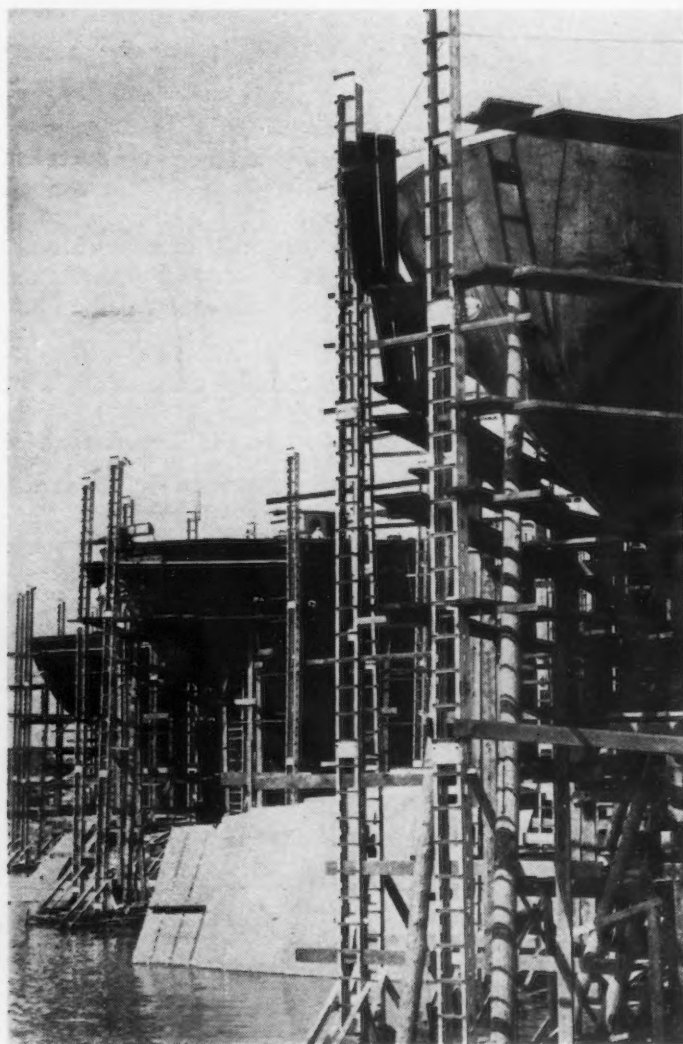




ALL-WELDED SHIPS — No division of the U. S. defense program is expanding more rapidly than shipbuilding. The two-ocean navy in four years will double the number of, and triple the tonnage of major war ships. Two hundred merchant vessels are being built. By the end of March American shipyards had under way contracts totaling \$5,-668,000,000 for naval vessels and cargo boats. At Pascagoula, Miss., the Ingalls Shipyard is rushing to completion these all-welded passenger ships, said to be the first in the world. Built by the U. S. Maritime Commission for the American South African Line, each of the three ships will cost \$4,099,000. All will be in service this year between New York and Cape Town. James A. Farrell, Jr. (left), son of the former president of U. S. Steel Corp., is president of the American South African Line. At the right, below, is an unusual photograph of fire-proof steel partitions welded in place on the *African Comet*. At the left, below, is a view of the sterns of the three new all-welded ships, new units in the nation's growing merchant marine.

4 New Jersey Schools Plan Foremen Training

• • • Four northern New Jersey engineering colleges—Newark College of Engineering, Princeton University, Rutgers University, and Stevens Institute of Technology—will jointly conduct a special 9-day intensive training course, June 21-29 inclusive, to instruct plant supervisors and foremen in the selection and training of industrial personnel and thus help to break one of the most serious bottlenecks of defense production in the aircraft and other industrial plants of the New Jersey and New York area. This tuition-free course, which will be at the Stevens Engineering Camp at Johnsonburg, N. J., will be part of the emergency defense training program of the U. S. Office of Education. Applications for admission will be received at Stevens Institute.



Steel Warehouses Face Problem of Keeping Up Stocks

San Francisco

• • • How, where and when to get steel is the problem facing the steel warehouses of the country. This was forcibly brought out by Walter S. Doxsey, secretary of the American Steel Warehouse Association, at the annual meeting of that organization held here this week.

The flood of steel orders which the warehouses have been receiving has completely washed out all of the industry's previous troubles arising from mill competition and mill sales policies.

"I have no quarrel," said Mr. Doxsey, "with those who maintain steel producing capacity is ample. Still, when you can't get half enough to take care of the insistent demands of your customers, you have a problem on your hands—and a tough one. With mill order books closed for the year and with only the haziest of hopes of getting deliveries at any time within 12 months, it takes a crystal gazer of the highest rank to determine what to order, how much to order, when to order, where to order it, and when to expect it."

Mr. Doxsey said that all of the warehouses have had the experience of being offered tantalizingly attractive orders, but he cautioned distributors that such temptations to sell in large quantities at attractive prices should not sway them away from the fundamental function of the steel warehouse distributor which, he said, is just the same today as it always was—namely, to sell small quantities of various items from stock to the thousands of users whose requirements are too small to be acceptable to the mills, and also to provide immediate delivery of the steel needed in emergencies.

He said that the mills have made valiant efforts to maintain distributor stocks so that the essential services would not be seriously curtailed. Federal officials directing the defense program have also recognized that adequately stocked steel warehouses

are vital to the essential functioning of industry. Such recognition, said Mr. Doxsey, puts an obligation on steel warehouses to distribute their stocks with good judgment, prudence and restraint.

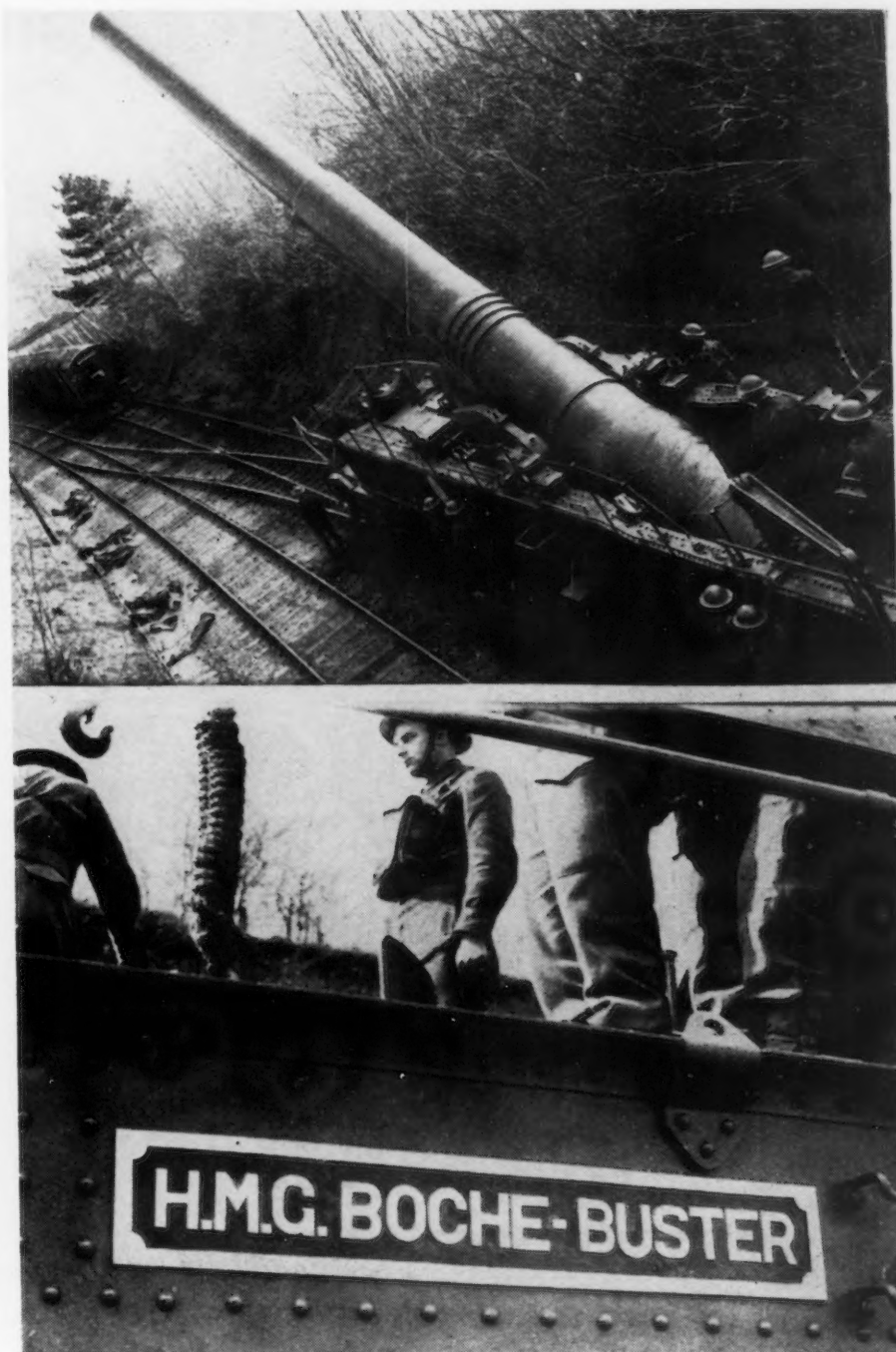
"Suppose, for example," said Mr. Doxsey, "it becomes impossible to obtain sufficient steel to replenish warehouse stocks." He added that severe rationing may be invoked to the point where warehouses will be unable to do

more than one-half or one-quarter of their present volume.

With all of the pressure that has been put on warehouses by steel users, many of whom are willing to pay premiums, the warehouses, according to Mr. Doxsey, have exercised great restraint in the matter of prices. They have generally refused to accept the premiums they have been offered, he said, and there have been no general advances in prices.

H. M. G. BOCHE-BUSTER: This railroad gun, of unrevealed caliber, is one of the world's largest weapons. It is being used by the British army. (Censored cutlines explain that H. M. G. means "his majesty's gun.")

Photo by International





TODAY'S demand is for faster production. Ford TRIBLOCS can help accomplish that demand. Because they are fast in operation—and because they are "on the job," ready for use, at all times.

TRIBLOCS are also directly saving countless dollars for these users. Because their first cost is low—and they are maintained at a minimum of expense.

The FORD TRIBLOC is a quality spur-gear hoist. It is made throughout of high grade drop forgings and malleable castings of certified grade. Its Acco High Carbon Heat Treated chain has great strength and high elastic limit. Each hoist must stand a 50% overload test before shipment.

Write for information on TRIBLOCS in 1/4-ton to 40-ton capacities.

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In Business for Your Safety

Tool Builders See Industry in Defense Forefront Through '42

Cleveland

• • • The expanded machine tool industry will remain very much in the forefront of the national picture through 1942 at least, speakers emphasized at the thirty-ninth Spring Convention of the National Machine Tool Builders' Association here May 5 and 6. Several hundred million dollars in new contracts are pending which will boost next year's defense program requirements over their 1941 level. Enlargement of the aircraft program alone probably will require a full six months' machine tool production.

Facing this new challenge, members of the association indicated that they would continue giving fullest cooperation and make necessary production step-ups wherever possible.

Salient points brought out by visiting Washington authorities centered around the extreme urgency of the program and the need for more speed everywhere. Delegates gained new insight into the magnitude of the government's plans and a realization that the nation cannot turn back. Discussion showed a rapid growth of regulations, including prohibi-



MASON BRITTON



CLAYTON R. BURT

tions on non-defense orders except by formal approval.

Practically every bit of the two-day conference, distinguished by the largest attendance achieved in the spring and by a general feeling among delegates that it was a most significant convention, was keyed almost entirely to ways and means of stepping up output.

"We have done a phenomenal job by any reckoning, but none of



HOWARD W. DUNBAR



The Sad, Sad Story of Mr. Splotz

Trouble was, Mr. Splotz had a problem—or rather the Problem had Mr. Splotz. It was something about a hairpin, or an anti-aircraft gun, or a bird cage—we don't quite remember.

Whatever it was, Mr. Splotz was in a stew. No matter what he tried, it was wrong. It wouldn't fit . . . or it wouldn't last . . . or it just wouldn't work. It was wrong. But Splotz was made of stern stuff. No surrendering for him—no sir!

Came his umpteenth try, however, and it still was wrong. Splotz began to crack. It was too much for any man—even he could stand no more. True, he made a few last feeble attempts, but his heart wasn't in it.

It was the end. Gloomily, Splotz breathed a last despairing sigh, picked up an automatic kept handy for such things, and called it a life...

Pardon the dramatics. Gritting your teeth on a problem may never kill you—but it does waste time.

You can hang on, bulldog fashion, just like Splotz . . . but why not save the high cost of stewing, and get all the help you can?

When it comes to mechanical steels, Frasse Technical Service engineers are experienced consultants, thoroughly quali-

fied to give you the answers. Hundreds of successful case histories in Frasse files prove their ability. Their steel knowledge, combined with your product knowledge, may save you days of fretting.

Next time you're inclined to tear your hair over a steel problem—don't. Save your time and temper by using Frasse Technical Service. It's free.

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ROCHESTER
Stone 4671

JERSEY CITY
Delaware 3-4888 Mitchell 2-4888

SYRACUSE
Syracuse 2-2655

us will ever be satisfied if we leave anything undone," said F. V. Geier, president of Cincinnati Milling Machine & Cincinnati Grinders, Inc., and Association president, as the sessions ended.

In his principal address at the opening of the convention Mr. Geier said that with mounting production more than 1000 machine tools are now being delivered to defense plants every day and suggested a program to speed in-

creased output from machine tools already installed in American industry.

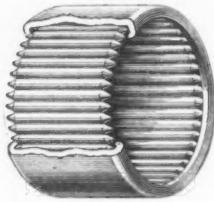
"Three methods of stepping up output from existing equipment," Mr. Geier said, "stand out as practical. First—operate this equipment more hours per week. Second—release critical machines from non-defense industries. Where production lines include a number of machines of the same type some could be release by put-



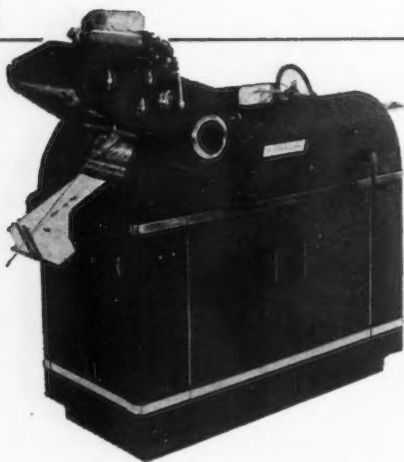
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*reduce friction, upkeep
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"OF PRIMARY IMPORTANCE in the new Model 1250 Multilith Duplicator, eight Torrington Needle Bearings give a low coefficient of friction at less cost than other anti-friction bearings," reports L. F. Mitchell, Chief Engineer of Addressograph-Multigraph Corporation. "These self-contained units are also quickly and inexpensively installed, using a simple arbor press."



"THE SMALL SIZE of Torrington Needle Bearings—no more than a plain bushing—allows reduction in size of housings and permits design simplicity. Efficient lubrication is here most important. The Needle Bearings have large capacity to retain and distribute lubricant. Maintenance and overhauling are held to a low point, eliminating a vexatious problem of neglect by users."

Your product, too, can gain important advantages by incorporating the small size, high radial load capacity, lubrication features, and surprisingly low cost of Torrington Needle Bearings. Our Engineering Department will be glad to give you full assistance. For more detailed information, write for Catalog No. 104. For Needle Bearings to be used in heavier service, write our associate, Bantam Bearings Corporation, South Bend, Ind., for Booklet 103X.

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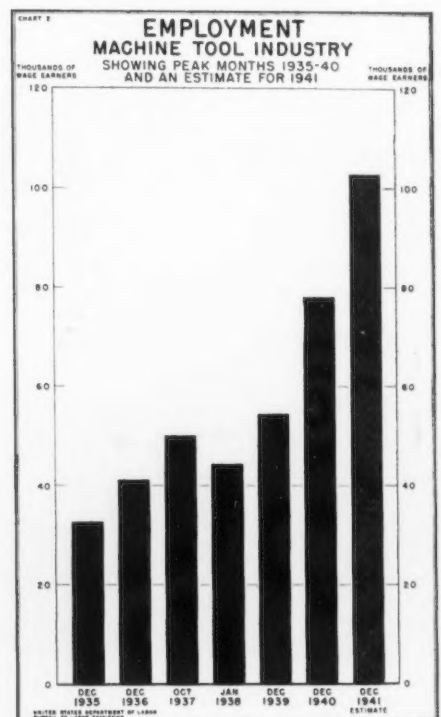
Makers of Needle and Ball Bearings

New York Boston Philadelphia Detroit Cleveland Chicago London, England

TORRINGTON NEEDLE BEARING

ting the remaining machines on a two or three-shift basis. Third—achieve greater production per machine. Machine tool equipment now installed in the plants of this country could readily yield at least 10 per cent more output per hour under proper tooling and operating conditions."

Mr. Geier predicted that 1941 output would be \$300,000,000 over





FREDERICK V. GEIER

that of 1940. He stated that the industry had doubled its working force in the past year with the employment of 40,000 additional men and has 14,000 men in training.

The effect of the Selective Service Act cannot be taken too seriously, asserted Tell Berna, general manager of the Association. He urged machine tool makers to take the initiative in preserving intact their skilled forces from the draft.

Clayton R. Burt, chairman of the industry's Defense Committee, and president of Pratt & Whitney, urged additional second and third shift operations and pictured the heavy new load which builders will have to take on their shoulders under the enlarged government program which is coming.

The necessity for the industry collecting fullest statistical information was emphasized by Charles J. Stilwell, president of Warner & Swasey Co.

A declaration that the United States now is up against the greatest emergency it has ever faced was made by Mason Britton, chief of the Tools Section of the O.P.M.

"It is up to this nation to lick the task and it is up to the machine tool industry to be the leader," he said, likening the defense program to a parade in

which items of foremost military importance come first.

Mr. Britton praised the industry for its phenomenal production job accomplished during the past year.

"Production is not being held up by lack of machine tools," he said. "The machine tool builders have responded to every demand."

Ralph E. Flanders, president, Jones & Lamson Machine Co., dis-

cussed priority ratings, how they are established and the possibilities for their extension and other questions.

Production requirements were outlined by Howard W. Dunbar, technical chief of the Tools Section of the O.P.M., whose address was illustrated by slides showing types of records on which production of machines is classified.

Here's the Air way
to make
PRODUCTION FLY!
With the New 3-lb.
Rotor Air Grinder



FOR SPEED AND STAMINA

A few of the 156 Rotor Air Grinders purchased by a large airplane engine manufacturer to speed up Defense production of cylinder heads. They're built to stand the gaff of 24-hour-per-day service. Weigh only 3 lbs. Run at 21,000 R. P. M.

Needed a sturdy, light-weight tool.

A large aircraft engine manufacturer required high-speed grinders to clean up aluminum cylinder heads. Had to get in between cooling fins with special 1/4" reamers, 2 1/2" long. Air supply was ample. They needed a light-weight tool—one that could "take it" 24 hours a day—for **SPEEDY DEFENSE PRODUCTION.**

It was a "natural" for the Rotor Die Grinder—an AIR tool. This magnesium-built grinder weighs only 3 lbs. You can move it around all day long—faster—with less fatigue. And, as for its ability to *stay on the job*—just try it! This engine manufacturer compared it to others . . . ordered 156 of them!

Now—they're really *cleaning up* cylinder head production schedules with these speedy, sturdy Rotors.

Air or High-Cycle? Study of your portable tool problems may show how to "buy time" for rush Defense work—to get *faster output and lower costs.* Call me in. No obligation. Remember, I can recommend either Air or High-Cycle—whichever best meets *your needs*—I'm unbiased.

THE ROTOR ANALYST

The Rotor Analyst has 65 different Air tools and 59 different High-Cycle tools with which to solve your grinding, sanding, drilling, etc. problems.

THE **ROTOR TOOL** CO.
CLEVELAND, OHIO
UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

AIR
HIGH CYCLE

Government Awards

Navy Dept., Bureau of Supplies and Accounts:

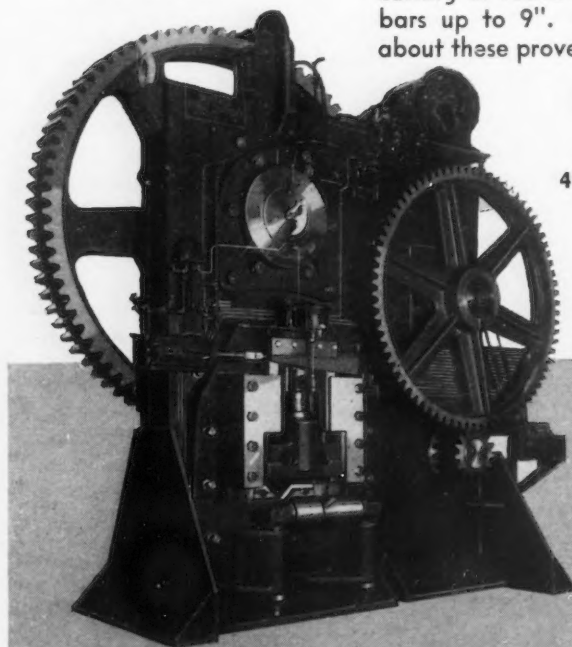
Aluminum Cooking Utensil Co., New Kensington, Pa.; frames, food carrier; containers, aluminum	\$7,913	American Automatic Electric Sales Co., Chicago; equipment, telephone	78,174
H. F. Allen Co., Inc., New York; lathes, engine, motor driven ..	17,430	American Bearing Corp., Indianapolis; bearings, shell, main ..	8,727
S. W. Allen Co., Orange, N. J.; assemblies, bomb arming wire ..	8,500	American Metal Co., Ltd., New York; lead, pig, grade A	111,062
Aluminum Cooking Utensil Co., New Kensington, Pa.; kettles, steam jacketed	51,277	American Smelting & Refining Co., New York; lead, sheet and pig	57,042
		American Steel & Wire Co. of N. J., Washington; cable, electric	46,266
		Anaconda Wire & Cable Co., Washington; cable	1,241,450
		E. C. Atkins & Co., Indianapolis; saws, band, hack, compass,	

band, keyhole, rip and miter box	8,020
Austin-Hastings Co., Inc., Cambridge, Mass.; grinder, surface, heavy duty	14,340
Automatic Pencil Sharpener Co., Division of Spengler-Loomis Mfg. Co., Chicago; sharpeners, pencil	15,142
Automatic Transportation Co., Division of the Yale & Towne Mfg. Co., Chicago; truck, electric crane, storage battery operated	10,568
Baker-Raulang Co., Cleveland; truck, crane, heavy duty	5,910
William C. Ballantyne, Washington; clips, paper, wire	11,562
Bay City Shovels, Inc., Bay City, Mich.; crane, truck, motor, gasoline	9,490
J. B. Brass Foundry Corp., New York; hooks, boat	13,731
Brown & Sharpe Mfg. Co., Providence; machines, screw, automatic	16,575
Bucyrus Erie Co., South Milwaukee; crane, dredge	160,350
Buss Machine Works, Holland, Mich.; surfacers, wood working, single, motor driven	10,977
Cincinnati Galvanizing Co., Cincinnati; receptacles, waste paper, steel	57,000
Cincinnati Shaper Co., Cincinnati; brakes, press, motor driven	17,359
Collyer Insulated Wire Co., Pawtucket, R. I.; cable, electric ..	34,057
Columbia Steel Co., Washington; anchors, steel	117,660
Consolidated Expanded Metal Co., Wheeling, W. Va.; metal, expanded	44,594
Covington Electrical Mechanical Co., Bowling Green, Ky.; cranes, manually operated for shipboard installation	37,180
Crescent Insulated Wire & Cable Co., Trenton, N. J.; cable	313,270
Crescent Truck Co., Lebanon, Pa.; trucks, industrial	5,244
Crucible Steel Co. of America, New York; ordnance equipment ..	1,727,019
DeLuxe Metal Furniture Co., Warren, Pa.; shelving, steel, dividers bin; fronts bin; holders, label	9,697
Denman & Davis, North Bergen, N. J.; steel, pearlitic manganese ..	10,839
Electro Metallurgical Sales Corp., New York; ferrosilicon, grades B and D	5,781
Engineering & Research Corp., Riverdale, Md.; machines, sheet metal forming and flanging, motor driven	8,818
machines, sheet metal shrinker ..	8,506
Erie Foundry Co., Erie, Pa.; hammers, forging, single, frame ..	16,215
Federated Metals Division, American Smelting & Refining Co., San Francisco; lead, sheet	10,789
Foot Brothers Gear & Machine Corp., Chicago; aircraft engine parts manufacturing facilities ..	103,814
Foster Brothers Mfg. Co., Utica, N. Y.; bedsteads, metal; springs ..	9,494
Flemm Lead Co., Inc., Long Island City, N. Y.; lead, sheet	21,119
General American Transportation Corp., Chicago; cars, box and tank, railroad	11,934
General Cable Corp., Washington; cable	2,045,271
General Electric Co., Schenectady; turbo-alternator	173,500
General Motors Corp., Cleveland Diesel Engine Division, Cleveland; shafts, crank, main engine assys., cylinder head	13,500
engine assy.	42,526
shell, connecting rod bearing ..	16,874
grinder, crankpin portable, pneumatic	15,668
engines, spare parts for Winton Diesel	13,608
	154,050

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YOU ARE CUTTING STOCK
FOR Axles... Shells...
Connecting Rods AND
OTHER BIG-VOLUME OUTPUT

... You'll keep pace with the fastest production schedules—
with Buffalo Billet Shears
handling the cutting job. Designed for swift efficiency ... built to stand the gaff of severe, 24-hour-a-day duty ... easy to control ... accurate ... economical to operate. Available in eleven standard sizes, for "one-bite" cutting of round bars up to 10" and square bars up to 9". Better start thinking *Now* about these proven aids to faster production.

Write for brand new Buffalo Billet Shear Bulletin 3295. Just off the press. Full details.



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Canadian Blower & Forge Co., Ltd. Kitchener, Ont.

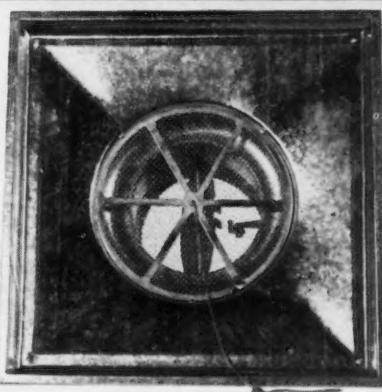
Buffalo's

BILLET
SHEARS

G. A. Gray Co., Cincinnati; planer, openseide	56,694
Graybar Electric Co., Inc., Wash- ington; cable, electric	10,586
Greenfield Tap & Die Corp., Greenfield, Mass.; dies, stocks, sets and wrenches	36,114
Grundler Crusher & Pulverizer Co., St. Louis; grinders, green garbage, with motors, controls and spare parts	65,689
Haffner-Thrall Car Co., Chicago; cars, flat, railroad	13,713
Handy & Harman, New York; alloy, brazing, silver, steel	40,925
Hardinge Brothers, Inc., Elmira, N. Y.; lathes, screw feed	6,791
Harnischfeger Corp., Milwaukee; seven bridge cranes	159,975
Harrisburg Steel Corp., Harris- burg, Pa.; compressed gas cyl- inders	1,173,000
Hercules Food Service Equipment, Inc., New York; cans, refuse, steel, galvanized	11,700
Hooven, Owens, Rentschler Co., Hamilton, Ohio; propelling ma- chinery for 13 submarine chasers	6,493,500
IDL Mfg. & Sales Corp., New York; shears, bankers, solid, steel	18,000
Ingersoll Steel & Disc Division, Borg-Warner Corp., New Castle, Ind.; shovels, general purpose, plain back	10,299
Irwin Auger Bit Co., Wilmington, Ohio; augers, ship, and bits ...	8,795
Jones & Lamson Machine Co., Springfield, Vt.; machine, thread grinding, motor driven	10,865
Jones & Laughlin Steel Corp., Pittsburgh; steel, grade Bw, bar, black, for reforcing	7,403
Kearney & Trecker Corp., Milwau- kee; machine, milling, vertical.	9,889
Kraeuter & Co., Inc., Newark; punches, cutting, arch or socket	6,532
Lamson Corp., Syracuse, N. Y.; trucks, frames and stands, shop	14,181
Landis Tool Co., Waynesboro, Pa.; machines, grinding, cylindrical, universal	47,185
Lawson Machine & Tool Co., Mal- den, Mass.; aircraft engine parts manufacturing facilities	116,876
Lionel Corp., New York; bin- nacles, compensating	52,500
Lodge & Shipley Machine Tool Co., Cincinnati; lathes	520,779
Edward A. Lynch Machinery Co., Philadelphia; presses, hydraulic, arbor mechanical	5,230
routers, jackknife	6,944
Mattatuck Mfg. Co., Waterbury, Conn.; bottoms, wire, for pipe berths; springs, helical	22,096
Mergenthaler Linotype Co., Brook- lyn; machines, type setting	10,907
Minneapolis-Moline Power Imple- ment Co., Minneapolis; tractors, gasoline engine driven, indus- trial	7,714
Montague Co., San Francisco; ranges, oil burning, two oven type	9,450
National Electric Products Corp., Pittsburgh; cable, electric	97,855
National Electric Welding Ma- chines Co., Bay City, Mich.; machines, spot welding, air op- erated	20,420
National Tube Co., Washington; flasks, steel, seamless, torpedo impulse, flanged neck, etc.	176,642
tubing, steel, seamless or welded	76,703
Norris Stamping & Manufacturing Co., Los Angeles; ordnance equipment	1,336,580
North Brothers Mfg. Co., Philadel- phia; screw drivers	5,042
Northwest Lead Co., Seattle; lead, sheet and pig	8,670
Oliver Farm Equipment Sales Co., Chicago; tractors, gasoline en- gine driven, industrial	21,773

Okonite Co., Passaic, N. J.; cable	123.916	Risdon Mfg. Co., Naugatuck,	
Phelps Dodge Copper Products		Conn.; grommets, spur, rolled	
Corp., Habirshaw Cable & Wire		rim, brass	103.500
Division, New York; cable	581.146	Roberts Numbering Machine Co.,	
Pioneer Instrument Division, Ben-		Brooklyn; machines, numbering,	
dix Aviation Corp., Bendix, N.		automatic	11.000
J.; sextants, high grade, end-		Rockbestos Products Corp., New	
less tangent screw type	52.600	Haven, Conn.; cable, electric ..	146.481
Pittsburgh Steel Foundry Corp.,		Selas Co., Philadelphia; heaters,	
Glassport, Pa.; anchors, steel ..	81.984	hot air, gasoline fired	138.440
Powder Metals & Alloys, Inc., New		Seneca Engineering Co., Montour	
York; cuprous-oxide, dry	43.500	Falls, N. Y.; system, crane,	
Henry Prentiss & Co., Inc., New		complete	27.029
York; machine, horizontal, bor-		Sengbusch Self-Closing Inkstand	
ing, drilling and milling	30.846	Co., Milwaukee; inkstands, au-	
Republic Chemical Corp., New		tomatic	25.727
York; ferromanganese	12.592	Shaw-Box Crane & Hoist Division,	

DRAWN in one Operation!



The ventilator pictured here is drawn in *one operation* from this special zinc-coated metal. ARMCO ZINCGRIP's tightly adherent zinc coating easily withstands this unusual draw without peeling or flaking. After the metal is drawn, the center hole is punched and the outside edge trimmed. Next the automatic damper is installed. It

This is only one of the many new applications for ARMCO ZINC-GRIP sheets and coils. Using coils, you can fabricate the metal at less cost, speed operations, reduce your inventory of stock sizes, and cut down scrap losses.

Would the unbroken zinc protection of ARMCO ZINGRIP be a big selling point for *your* drawn products? It may pay you to consider its many advantages. When you write for more information, just address The American Rolling Mill Co., 1791 Curtis St., Middletown, O.



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... is providing more comfort for passengers, faster service, with the aid of Heppenstall products; such as piston rods, crank pins, axles, Heppenstall Automatic Safe-T-Tongs for lifting materials, die blocks for forging parts and products, shear knives for cutting metals, "tailor-made" forgings and many other forged products. Heppenstall Company.

Heppenstall



PITTSBURGH · DETROIT · BRIDGEPORT

GOVERNMENT

Manning, Maxwell & Moore, Inc., Muskegon, Mich.; seven bridge cranes	86,240
Silent Hoist Winch & Crane Co., Brooklyn; cranes, mounted on gasoline driven, wheel type tractor	14,835
Simmons Co., New York; furniture, metal tubular	5,864
Henry Spen, Inc., New York; carts, water	16,161
Thomas Somerville Co., Washington; sets, threading, pipe	5,690
Stanley Tools Division, The Stanley Works, New Britain, Conn.; chisels	9,488
Stevens Metal Products Co., Niles, Ohio; drums, steel, galvanized ..	43,971
Swind Machinery Co., Philadelphia; machine, drill, radial, motor driven	11,442
Swindell-Dressler Corp., Pittsburgh; furnaces, steel, electric ..	62,103
Taylor-Parker, Inc., Norfolk, Va.; saws, cross cut, two man and hand, and hack	21,939
Tinius Olsen Testing Machine Co., Philadelphia; machine, Hatt-Turner Impact, No. 2	6,150
Tuthill & Co., Inc., Sales Agents Tin Sales Office, Netherlands Indies Government, New York; tin, pig, grade A	288,960
Union Twist Drill Co., S. W. Card Division, Mansfield, Mass.; dies, adjustable; taps, hand	25,072
U. S. Axle Co., Inc., Pottstown, Pa.; stands, engine	24,358
United Wire Goods Mfg. Co., Inc., New York; screw drivers, common	10,881
Utica Drop Forge & Tool Corp., Utica, N. Y.; nippers, end cutting, pliers, diagonal, round nose and side cutting	71,074
Ward Leonard Electric Co., Mt. Vernon, N. Y.; units, rheostat and spare parts	76,582
J. Wiss & Sons Co., Newark; shears	7,618

War Dept., Ordnance:

Acetylene & Oxygen Supply Co., Inc., Long Island City, N. Y.; outfits, oxy-acetylene	\$6,398
Accurate Tool & Die Co., Newark; tools	25,713
Alloy Fabricators, Inc., Welin Davit & Boat Corp. Division, Perth Amboy, N. J.; kettles, mixing	5,994
Austin-Hastings Co., Inc., Cambridge, Mass.; lathes	33,220
American Cutter & Engineering Co., Detroit; punches and punch holders	10,641
American Smelting & Refining Co., Federated Metals Division, New York; solder	9,807
Auto-Ordnance Corp., Bridgeport, Conn.; small arms materiel ...	5,347
Bonney Forge & Tool Co., Allentown, Pa.; tools	8,354
Breeze Corps., Inc., Newark; cartridges, winter starting	14,219
Bridgeport Brass Co., Bridgeport, Conn.; cups, case	1,574,275
Brown Brockmeyer Co., Inc., Dayton, Ohio; grinders, bench	6,531
Brown & Sharpe Mfg. Co., Providence; repair screw machines ..	12,420
Buffalo Forge Co., Buffalo; presses, drill	6,388
Blanchard Machine Co., Cambridge, Mass.; grinders	8,210
Cleveland Cutter & Reamer Co., Cleveland; tools	13,990
Consolidated Expended Metal Co.'s, Wheeling, W. Va.; ladders, steel ..	5,450
Copperweld Steel Co., Warren, Ohio; steel	15,445
County Supply Co., Plainfield, N. J.; cans, oil and plates, surface ..	9,420
Detroit Broach Co., Inc., Detroit; equipment, broaching	22,730
Doehler Die Casting Co., Pottstown, Pa.; castings	91,232

AWARDS

Faries Mfg. Co., Decatur, Ill.; parts for primer	225,673
General Machinery Corp., Niles Tool Works Division, Hamilton, Ohio; tools, machine	668,981
Great Lakes Steel Corp., Ecorse, Detroit; steel	21,490
Hardinge Brothers, Inc., Elmira, N. Y.; lathes	13,689
Homelite Corp., Port Chester, N. Y.; generators, portable	62,086
McKinney Mfg. Co., Pittsburgh; hinges, hasps, and swivel assys.	8,999
Metal & Thermit Corp., New York; welding electrodes	5,170
Morton Mfg. Co., Chicago; bins, cabinet	54,412
Norton Co., Worcester, Mass.; grinders	26,675
Ocean City Mfg. Co., Philadelphia; primers	26,460
Onsrud Machine Works, Inc., Chicago; lathes	10,756
Owens-Illinois Glass Co., Alton, Ill.; tools, parts	6,437
Patterson Foundry & Machine Co., East Liverpool, Ohio; equipment, agitating	6,480
Republic Steel Corp., Buffalo; blanks, barrel	109,140
Roeper Crane & Hoist Works, Inc., Reading, Pa.; cranes, traveling	5,692
Schramm, Inc., West Chester, Pa.; power plant, portable	13,875
Seneca Falls Machine Co., Seneca Falls, N. Y.; lathes	24,837
E. H. Sheldon & Co., Muskegon, Mich.; cabinets	71,292
Shipley Machinery Co., lathes	37,620
Specialty Auto Fabric Corp., Sioux City, Iowa; presses, axle	9,415
Sullivan Machinery Co., Boston; compressors	21,704
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis.; parts for tanks	66,762
Veit & Young, Philadelphia; punches	16,011
S. K. Wellman Co., Cleveland; parts for tanks	18,019
Wiedemann Machine Co., Philadelphia; gages	8,542
Joseph Weidenhoff, Inc., Chicago; benches, fixtures	7,813
John Wood Mfg. Co., Inc., Muskegon, Mich.; equipment for machine gun	655,803
Yale & Towne Mfg. Co., Stamford, Conn.; padlocks	100,611
War Dept., Other Agencies:	
Anchor Post Fence Co., Baltimore; fence, wire and gates, chain link type	87,575
Bates Chevrolet Corp., New York; automobiles and trucks	9,270
B. F. Curry Co., New York; trucks	2,646
Curtiss-Wright Corp., Curtiss Aeroplane Division, Buffalo; airplanes and spare parts	13,360,562
Eaton Mfg. Co., Saginaw, Mich.; additional machinery and equipment for manufacture of aircraft engine parts	133,337
William O. McKay Co., Seattle; trucks	57,413
Monarch Machine Tool Co., Sidney, Ohio; engine lathes, aircraft assembly plant, Kansas City, Kan.	17,002
Palma Motor Sales & Service Corp., Staten Island, N. Y.; trucks, canopy type	6,554
Portland Wire & Iron Works, Portland, Ore.; structural steel	5,427
Revere Copper & Brass, Inc., Chicago; facilities for production of cartridge, brass and cases	10,000,000
Salta Corp., Jersey City; valves, outlet	9,960
H. W. Schultes, Brooklyn; forceps	3,665
Tampa Shipbuilding Co., Inc., Tampa, Fla.; equipment for pumping station	2,850
Worthington Pump & Machinery Corp., Harrison, N. J.; equipment for pumping station	23,298



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There is an ELASTUF Steel available to cover every machinery steel need. By standardizing your specifications in this complete, related ELASTUF group, you save countless hours in selection—even more in plant time. It isn't necessary for everyone down the line to get acquainted with a new steel every time a new part is designed. You don't have to guess which steel to use because the Machinery Steel Selector shows you. You don't have to heat treat; physicals are in ready-for-use condition.

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1. Proven performance.
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3. Selection without guesswork.
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6. No premium in cost.
7. Always available at nearby points.

Many plants have standardized on ELASTUF Steels because they cover the complete need—come from one source—and no one has to take chances on a new and unknown steel. And their uniformity eliminates the need for constant testing to determine machining methods. Many plants maintain complete information on these steels at every point in office and shop. We can help you do this. Just call, or write, the nearest office listed below.

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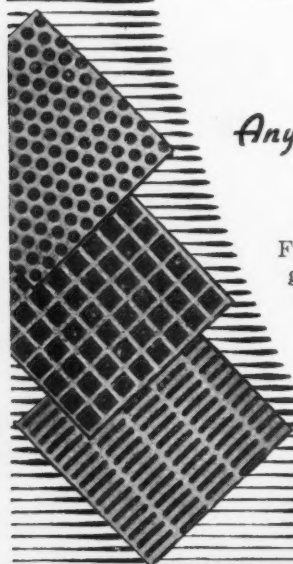


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Canada Restricts Automobile Output

Toronto

•••To provide increased plant capacity and at the same time conserve foreign exchange for Canada's war effort, an order has been issued by John H. Berry, Motor Vehicles Controller, to Canadian motor manufacturers to reduce substantially their output of passenger automobiles covering the period to the end of this year. The number of cars which may be produced will be based upon the foreign currency requirements of each manufacturer to pay for parts imported from the United States. Companies will be allowed 20 per cent less foreign exchange than they were in the like period of 1940. The number of cars produced, however, may not be reduced by similar amount as manufacturers may choose to make "economy" cars which have individually a low foreign currency content. As a consequence some of the makers will increase the Canadian content in their vehicles.

The Canadian Motor Vehicle Controller has ordered all makers to obtain licenses to manufacture cars from his office by May 31. The order does not cover trucks or commercial vehicles. The three motor car manufacturers in Canada, Chrysler, Ford and General Motors have received their quotas for the period April 1 to December 31. Mr. Berry stated that the order should induce manufacturers to concentrate on production of cheap rather than expensive cars.

Tenders will be called immediately by the Department of Munitions and Supply, Ottawa, for the erection of a plant at Windsor, Ont., to manufacture anti-aircraft machine guns. The combined cost of construction and equipping the plant will be approximately \$8,000,000. The new plant will be wholly owned by the Government, which is providing the necessary capital. It will be operated by a subsidiary of General Motors Corp. of Canada, Ltd., to be known as the Border Cities Industries, Ltd. The plant will produce Browning high speed machine guns complete, except for the bar-

Steel Plant Studied For British Columbia

Toronto

••• William A. Haven of Arthur G. McKee & Co., consulting engineers, Cleveland, has completed a survey of the possibilities of establishing an iron and steel plant in British Columbia on behalf of the provincial government. A report and recommendations will be submitted soon. Private capital may be asked to participate. Some years ago provision was made to subsidize producers of iron and steel in British Columbia by the government. This legislation still is on the statute book.

rels. The barrels to be turned out in another Canadian plant.

The Department of Munitions and Supply, Ottawa, for the two weeks ending May 2, placed 4780 contracts, with total value of \$16,315,013, including orders to United States companies valued at \$138,178. Orders include:

Capital expenditure—Ontario Electrical Construction Co., Ltd., Toronto, \$46,465; Canadian Westinghouse Co., Ltd., Hamilton, \$31,477; Defence Industries, Ltd., Montreal, \$727,273; T. C. Gorman (Nova Scotia, Ltd.), Montreal, \$53,130; Central Bridge Co., Ltd., Trenton, \$110,700; A. W. Robertson, Ltd., Toronto, \$200,038; Standard Machine & Tool Co., Windsor, \$25,900; Mackenzie Air Service, Ltd., Edmonton, Alta., \$105,160.

Metals—Allied Brass, Ltd., Montreal, \$49,718.

Shipbuilding and Dockyard Equipment—Canadian Power Boat Co., Ltd., Montreal, \$87,683; Halifax Shipyards, Ltd., Halifax, N. S., \$26,365; General Steel Wares, Ltd., Montreal, \$23,850; Heaps Engineering Co., Ltd., New Westminster, B. C., \$48,240; Alexander Fleck, Ltd., Ottawa, \$21,835.

Instruments—R.C.A. Victor Co., Ltd., Ottawa, \$60,122; Sutton-Horsley, Ltd., Toronto, \$22,680.

Mechanical transport—General Motors Products of Canada, Ltd., Oshawa, \$1,539,353; Metallic Roofing Co. of Canada, Ltd., Ottawa, \$146,472; Ford Motor Co. of Canada, Ltd., Windsor, \$37,413.

Aircraft—Weaver Industries, Ltd., Chatham, \$26,550; Air Ministry, England, \$189,000; Fairchild Aircraft, Ltd., Longueuil, \$50,742; Dominion Merchants Co., Ltd., Montreal, \$43,674; Engineering Products Co. of Canada, Ltd., Montreal, \$85,452; J. H. Connor & Son, Ltd., Ottawa, \$34,000; John Leckie, Ltd., Toronto, \$25,211.

Ordnance—Canadian Elevator Equipment Co., Ltd., Toronto, \$212,447; National Research Council, Ottawa, \$85,000.

Munitions—Dominion Arsenals, Ottawa, \$3,898,640; Anaconda American Brass, Ltd., New Toronto, \$87,345; Rogers-Majestic Corp., Ltd., Toronto, \$33,523; Steel Co. of Canada, Ltd., Hamilton, \$33,264; International Metal Industries, Ltd., Toronto, \$238,140; Engineering Products of Canada, Ltd., Montreal, \$252,380; Casavant Freres, Ltd., St. Hyacinthe, Que., \$30,285.

WAR DEFENSE

demands super products—super in quality—in dependability—in perfection.
For almost a century Clark has been supplying such products to every known industry, in all parts of the world.

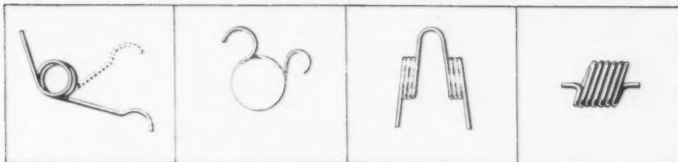
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MILLDALE, CONN.

Large enough to supply your needs
—small enough to give you
personal service.

CLARK BOLTS

the practical side of Springmaking — BY DUNBAR

Some tips on TORSION SPRINGS



- * They should be free on rod or post—when under full load.
- * The action should tend to reduce or wind the coils.
- * Sharp bends should be eliminated.
- * Material should be selected for individual conditions of temperature, corrosion or stress.
- * Ends should be designed for easy assembly.



WE RECOMMEND

that you send us your assembly. We may be able to anchor one arm to it—or change the contour to save on assembly time.

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT

"Quality Springs Since 1845"

Gearmakers Discuss Defense Problems

(CONCLUDED FROM PAGE 61)

He suggested cutting off the furnace heat during the critical range, allowing the work to soak at this point.

Some further distortion occurs in parts during quenching and in

high alloy steels. This can be greatly mitigated by quenching on a falling heat after the work has cooled in the furnace several hundred degrees below the top temperature. This procedure is possible because of the considerable lag in high alloys before any structural change occurs. The quench will then be less drastic. Besides, most alloys have a tendency to grow

when quenched from a high temperature and shrink a little when quenched near the recalescent point. By playing with this variation, Mr. Buehler said it is possible on many parts to avert volumetric change almost entirely by varying the quenching temperature. For this purpose, he suggested constructing a time-temperature chart from a coupon of each mill heat before any fragile parts from that heat are hardened.

Gear Tooth Analysis

An elaborate mathematical analysis of the determination of the form or "Y" factor used in the Lewis formula for calculating gear tooth strength was presented by Michael Maletz of the Kearney & Trecker Corp. He derived a series of equations for determining through analytical geometry the point of tangency of the root fillet of the tooth (usually in the form of a looped epitrochoid) and the parabolic curve of an equivalent beam of uniform strength. Mr. Maletz' solution was offered as a more accurate method of determining the point of tangency (weakest section of the tooth) than the graphical methods in use up until now. Some in the audience maintained that the graphical method was substantially accurate and faster, while others indicated that the author's formulas showed results obtained graphically to be off as much as 20 per cent.

Defense Plant Corp. Buys 300 Milling Machines

Boston

•••The Van Norman Machine Tool Co. has received a \$2,000,000 government order for milling machines to be used in several big new defense plants. Approximately 400 additional employees will be needed at the plant, boosting the number on the payroll to more than 2000 for production of about 300 milling machines weighing four tons each.

The order is the first of its kind placed by the Defense Plant Corp. at Washington, a division of the R.F.C. created to take title to plants being built with government funds. The order boosts the Van Norman defense backlog to more than \$4,000,000.

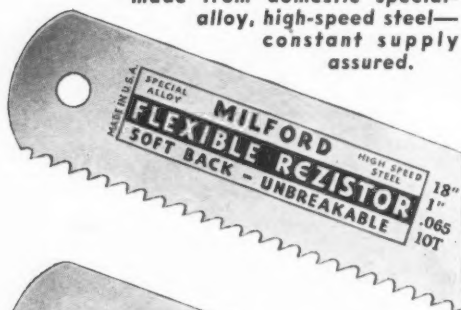
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THE HENRY G. THOMPSON & SON CO.

NEW HAVEN, CONN.

Cincinnati Exhibit Dramatizes Machine Tools in Defense

• • • A Liberty Bell exhibit for the machine tool industry is planned at the Miami Valley Industry and Defense Exposition to be held May 28 to June 8 in Music Hall, Cincinnati.

A giant Liberty Bell will be the exposition theme. The five processes of the machine tool—turning, drilling, milling, planing, and grinding—will be reflected against the sides of this great bell by translucent lighting.

A miniature train will be used to draw carloads of products of peacetime activity about the big bell in one direction, representing products made by machines fashioned from machine tools. On another plane, circling the bell in the opposite direction, the wartime products of the machine tool will be displayed. Since every machine tool is needed in the factories to hasten the defense preparations, none will be shown "in the flesh."

Exhibit booths will be used to show the amount of work and investments in employee training; charts, graphs, and pictures illustrating the expansion and acceleration of production facilities; how machines are built from machine tools making the products shown. A theatre is also to be set up to show industrial films.

Other parts of the Exposition Hall will be given over to aviation, naval, transportation, communication, health, food, shelter, and clothing exhibits. On the wide esplanade will be shown the latest of military, naval, and aviation equipment.

Coordinated with these exhibits will be complete operating vocational school classrooms, offering visitors a chance to see how plants are educating and training young people for key defense jobs now—and for steady peacetime jobs later on.

The exposition is being supported by outstanding industrial and civic leaders of the Miami Valley.

More than 250,000 persons from the Cincinnati tri-state area

and other sections of the mid-west, are looked for. The opening day will be "Defense Day" in Ohio.

Executive headquarters for the exposition are located in Suite 405, the Schmidt Building, Cincinnati, Ohio.

82 Hartford County Plants Add 3033 Men

• • • The Manufacturers Association of Hartford County, Conn., reports that during April the number of persons employed in 82 plants in and around Hartford, New Britain and Bristol increased 3033 or 3.4 per cent, and the number of manhours worked 572 or 3.3 per cent. At the 43 plants in the Hartford district alone, employment increased 4.1 and manhours 4.4 per cent. As of May 1, the number employed in Hartford County was 173.4 per cent of the Jan. 1, 1929, normal, contrasted with 167.6 per cent on April 1. The May 1 manhours index was 161.8 per cent of normal, as against 156.5 per cent on April 1. As of May 1, 1940, employee index stood at 122.9 per cent of normal and manhours index at 98.6 per cent.

Scrap Exports Drop 19,995 Tons in March

• • • Scrap exports declined to 54,383 gross tons during March, according to preliminary figures compiled by the Durable Materials Unit, Bureau of Foreign and Domestic Commerce. This compares with 74,378 tons during February and 206,928 tons in March, 1940.

March exports brought the total figure for the first quarter this year to 173,816 tons of scrap, or 27.5 per cent of the 629,101 tons exported during the comparable period last year.

March shipments to the United Kingdom totaled 45,084 tons; to Canada, 5475 tons. Mexico, the only other market of consequence, took 3261 tons.

Included in the March total were 53,938 tons of iron and steel scrap, comprising 15,155 tons of No. 1 heavy melting steel, 23,788 tons of No. 2 heavy melting steel, 2471 tons of baled and bundled scrap, 2686 tons of cast and burnt scrap, and 9838 tons of "other" iron and steel scrap. Also included in the 54,383 tons total were 300 tons of tin plate circles, cobbles, etc., and 145 tons of waste-tin plate.

NOON ON A BATTLESHIP: On May 15, far ahead of schedule, this new U. S. battleship, the 35,000-ton Washington, is to be commissioned at the Philadelphia Navy Yard.

Photo by Wide-World



Henderson Favors 30 New Blast Furnaces

Washington

••• Placing, as he said, "chief emphasis on expansion, first, last and all the time," Price Administrator Leon Henderson waded in neck deep last week and told the House Committee on Ways and Means that steel production would be at the rate of 92,000,000 tons by next March, which he predicted, "isn't enough in terms of needs as measured by the lofty requirements of national security, and the lowly requirements of the brave and resourceful workers in Chungking and Coventry."

Mr. Henderson did not tell the Committee how much additional steel capacity should be built but is reported to advocate an expansion of 30,000,000 tons. He was specific respecting new blast furnace capacity. He suggested the building of 10,000,000 more tons of pig iron capacity, which, converted into units, would mean about 30 new 1000-ton furnaces. If this new blast furnace capacity were built, Mr. Henderson said, and "if we find 10,000,000 more tons of scrap, . . . if we bring down 10,000,000 more tons of ore from the Mesabi—and I am supremely confident these are possible, we can gain \$4,000,000,000 in national income, eight points in the index of production, and either put 1,000,000 more people to work, or keep the same number from being thrown out of work by a shortage of steel."

Mr. Henderson gave no supporting evidence of a shortage in steel, though the cry has become increasingly common. On the part of some the voices of expansionists are said to be timed to the forthcoming Gano Dunn report on steel capacity. Though he did not directly urge steel expansion, but rather proposed rationing, Rear Admiral Samuel M. Robinson, chief of the Navy's Bureau of Ships, told the House Committee on Naval Affairs last week that there is not enough steel in this country.

"Steel is going to have to be rationed like aluminum," the Admiral said. "That is a question that has got to be decided."

Using what seems to be an ac-

cepted loose arithmetical formula of one ton of steel for each \$1000 of national income, some government economists, forecasting a national income of \$100,000,000,000 in 1942, American defense, British and civilian steel requirements in that year are placed at 110,000,000 to 120,000,000 tons. This is a great exaggeration of some other estimates. The latter place American, Army, Navy, Maritime Commission, British and export requirements for 1942 at about 28,000,000 tons. Assuming a 92,000,000-ton capacity early next year, this would leave 64,000,000 tons for civilian needs.

Maximum civilian needs for 1940 were 55,000,000 net tons of ingots and rather than increasing it is believed civilian requirements next year will decrease below that tonnage so that there would be a leeway of more than 900,000 tons of steel making capacity over all demands.

Allegheny Ludlum Stainless Casting Orders At New Peak

••• Unfilled orders at the Buffalo foundry of the Allegheny Ludlum Steel Corp. have reached a new peak. The plant specializes in stainless steel castings, utilizing unique developments in electric furnace design and melting technique. First quarter sales for 1941 were reported as equal to 50 per cent of the 1940 total, whereas 1940 itself was 212 per cent ahead of 1939 sales.

Falk Adds 26 Men Above 70 To Payroll

Milwaukee

••• The Falk Corp last week demonstrated its policy of hiring employees on the basis of their fitness for the job rather than their age when the employment office took on two men from one family, a father of 70, retired railroad man, and his son, aged 29. The father will sort scrap metal in the plant maintenance department. Records disclose that this 70-year-old newcomer was the 26th man of his age to join the Falk payroll. Of these 19 are between the ages of 70 and 75, six between 75 and 80 and one veteran exceeds 80 years. About 39 per cent of Falk employees are over 40 years old.

OPM Broadens List Of Critical Items

Washington

••• The range of products on which the Army and Navy can assign preference rating certificates has been broadened considerably with publication by the OPM Priorities Division of the latest priorities critical list. For the first time, the definition of the designated critical items was broadened to include in addition to the specific items listed "all fabricated, mechanical or electrical components, parts and accessories necessary for the completion, maintenance or mechanical operation thereof."

The new list, which is no longer limited to parts and accessories designed to meet military specifications but is made to include items commercially useful for civilian purposes, was interpreted by OPM officials to mean that it would be difficult to name a single item on which the Army or Navy could not obtain priorities.

The priorities critical list, subject to revision once a month, is a compilation of items on orders for which the appropriate Army and Navy representatives may issue preference rating certificates automatically. Army and Navy procurement officers and inspectors may also assign preference rating certificates on sub-contracts for these items, subject to regulations set forth in the War and Navy Department instructions.

The addition of iron and steel products to the critical list was made.

Antimony, cadmium, chromium, cobalt, copper, pig and fabricated; ferrous alloys, all types; iron and steel products, including rolled drawn, forgings, castings and pig iron including alloy steels; lead; manganese or spiegeleisen; molybdenum; non-ferrous alloys, all types; semi-finished, finished and fabricated steel; and welding rod.

In addition, the following items were added:

Diesel engines, all types; internal combustion and steam engines for ship propulsion; electrical and motor dynamometers; electric motors, except fractional horsepower; and portable, power-driven tools.

94 Carbon Steels Are Listed by Institute

••• Broadening its program for increasing efficiency in steel production by encouraging a reduction in the number of kinds of steel ordered, the general technical committee of the American Iron and Steel Institute has selected a list of standard carbon steels.

The committee recently made public a list of 76 standard alloy steels, and a list of standards for pig iron. The move toward standardization follows a two-year study of the needs of consumers, to determine which of the thousands of varieties produced each year were in most common demand.

Compositions of proved merit have been selected for the list of standard carbon steels, which is divided into five groups. A total of 94 separate compositions has been chosen of which 41 are for use in semi-finished steel, 59 for use in bars, and 76 for use in wire rods. Some of the compositions are standard for more than one type of product.

The five groups consist of basic open-hearth and acid bessemer carbon steels; basic open-hearth sulphurized carbon steels; acid bessemer sulphurized carbon steels; basic open-hearth phosphorized carbon steels; and acid open-hearth carbon steel wire rods.

The committee has taken as standards the ranges and limits of compositions which have been widely used by steel producers and consumers in recent years. The list of standard carbon steels is largely based on these standard ranges and limits. For such non-standard steels as may occasionally be needed for special uses, specifications will also be based on these standard ranges and limits. By encouraging the concentration of production on standard carbon steels, it is hoped to expedite deliveries and improve service during the defense emergency and to reduce the unnecessarily wide range of specifications for normal peacetime products.

Standardization and simplification, the institute says, should also make possible other advantages for producers and buyers,

U. S. Steel Shipments Off 32,692 Net Tons

••• United States Steel Corp. subsidiaries shipped 1,687,674 net tons of finished steel products in April, compared with 1,720,366 net tons in March, and with 907,904 tons in April, 1940. For the first four months of 1941, shipments were 6,638,945 net tons, against 3,994,657 tons in the like period of 1940, an increase of 2,644,288 tons.

such as greater effectiveness in research work and improvements in manufacturing methods. In most cases, consumers can adopt standard steels without changing manufacturing procedure or impairing the quality of their goods.

As in the case of standard alloy steels, a system of symbols has been set up to identify standard carbon steels.

The general technical committee will review the list of standard steels at frequent intervals, with a view to keeping it abreast of current practices and needs.

COAL STRIKE BROUGHT DOWN APRIL STEEL OUTPUT

Production of 6,757,728 net tons of steel during April was below the revised March total of 7,131,641 tons, according to the monthly report of the American Iron and Steel Institute.

The decline reflects both the recently ended bituminous coal

strike and the fact that April had one less working day than March. Compared with April, 1940, however, output last month showed an increase of nearly 65 per cent.

During April, the steel industry operated at an average rate of 97.6 per cent of capacity, compared

with 99.7 per cent (revised) in March and 61.2 per cent in April a year ago.

Steel production averaged 1,575,228 tons a week during April, as against 1,609,851 tons a week in March and 955,821 tons a week in April of last year.

Based on reports by companies which in 1939 made 98.26% of the open hearth, 100% of the bessemer and 84.39% of the electric ingot and steel for castings production

Period	* Estimated Production—All Companies								Calculated Weekly Production, All Companies	Number of Weeks
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity		
January	6,271,862	99.0	451,637	76.0	205,256	93.4	6,928,755	96.9	1,564,053	4.43
February	5,673,289	99.2	378,330	70.5	186,281	93.9	6,237,900	96.6	1,559,475	4.00
March	6,461,936	102.0	460,169	77.4	209,536	95.4	7,131,641	99.7	1,609,851	4.43
1st Quarter	18,407,087	100.1	1,290,136	74.8	601,073	94.2	20,298,296	97.8	1,578,406	12.86
April	6,130,638	99.9	395,009	68.6	232,081	109.1	6,757,728	97.6	1,575,228	4.29

Note—The percentages of capacity operated are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of December 31, 1940, as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons.

* Figures revised January through March.

Standards Bureau Seeks Copper Wire Simplification

• • • With more than 175 effective peacetime simplified recommendations, simplification is again being put to work in the present emergency, as pointed out by Edwin W. Ely, Chief, Division of Simplified Practice, Bureau of Standards, to serve a useful purpose as it did in the 1917-1918 emergency.

The latest proposal, sponsored by National Electric Contractors Association, would adopt 19 stock sizes of copper conductors in the range from No. 14 (American wire gage) to 500,000 circular mills. Sizes larger than 500,000 circular mills would not be carried in stock. They would be made available only on order. The conference, consisting of representatives of manufacturers, distributors, users and governmental agencies unanimously decided that the demand for sizes No. 5 and No. 3 was not sufficient to warrant their retention.

Everyone concerned is urged by the division to obtain a copy of the summary report of the conference and proposed recommendation. Requests should be addressed to the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Alabama Operators Sign Temporary Coal Agreements

Birmingham

• • • Most of Alabama's commercial coal mine operators and one captive mine operator, Sloss-Sheffield Steel & Iron Co., signed a temporary agreement last week with United Mine Workers of America to bring to partial end the work stoppage in the state's soft coal fields which started at midnight March 31.

The temporary agreement, identical in wage increases to the Southern Appalachian agreement, provides a basic wage increase of \$1 a day, \$1.40 a day increase for operators of mechanical units and various increases for piecework.

If the temporary agreement for the Southern Appalachian field is voided by failure to agree on a contract, the temporary Alabama agreement also will be voided.

Thyssen's Death Reported In Concentration Camp

London

• • • Fritz Thyssen, great German steel magnate, is stated to have died in a concentration camp, according to an authoritative Vichy report.

Herr Thyssen was one of Hitler's earliest and most powerful supporters and is said to have contributed some 62,000,000 marks to the Nazi Party's coffers. Rumors of disagreement between Thyssen and Hitler were current as early as 1936; and when the German-Soviet Pact of Non-Aggression was signed the breach became final.

At the end of 1939 the whole of his industrial interests, real estate, and personal property were declared confiscate to the German Reich, and in February, 1940, a decree was issued depriving him of German citizenship. A month later he left Switzerland for France, where he is stated to have fallen into the hands of the Gestapo.

Navy Awards Large Ordnance Contracts to G-E

Washington

• • • The Navy Department has announced that it has entered into contracts with the General Electric Co., Schenectady, N. Y., for the acquisition and installation in the contractor's plants at Schenectady, Erie, Pa., and Pittsfield, Mass., of special additional equipment and facilities for the production of ordnance equipment at a total cost not to exceed \$18,367,706. The awards for the individual plants are as follows: Erie Plant, \$2,973,249; Schenectady Plant, \$7,212,239; and Pittsfield Plant, \$8,182,218.

The RFC has authorized an additional loan of \$2,017,000 to Tampa Shipbuilding Co., Inc., Tampa, in connection with constructing and acquiring shipbuilding facilities for the Navy, making a total authorization of \$2,255,800.

The RFC also has authorized two additional loans to Beech Aircraft Corp., Wichita, Kan., one for \$2,000,000 to finance an additional airplane contract, and one for \$49,200 for airplane parts.

Court Upholds NLRB on Bethlehem Plant Unions

• • • Over the dissent of Justice Stephens who said that the order should be set aside and remanded for a new hearing because the earlier hearing was "vitiated by the bias of the examiner," the United States Court of Appeals for the District of Columbia in a two-to-one decision on Monday upheld a National Labor Relations Board order requiring the Bethlehem Steel Co. to disestablish the employee representation plan.

Pullman-Standard Builds Its First Trench Mortar

• • • First 81 mm. trench mortar off the line of the Pullman-Standard Car Mfg. Co. plant in Hammond, Ind., was presented to Col. Donald Armstrong, chief of Chicago Ordnance District on May 8. Mass production of the trench mortars is expected soon. The same plant has also started manufacture of 105 mm. howitzer gun carriages. Simultaneously, a line is being set up for the machining of 155 mm. shells. Pullman-Standard is also making 28-ton tanks for England.

Stettinius Opposes Cox Priorities Amendment

• • • Officials in the OPM Priorities Division were confident this week that the Senate would approve the pending bill to give express statutory authority for the priorities system, and strike out the controversial Cox amendment which would take control of priorities out of civilian hands and vest the power in the Army and Navy.

Director of Priorities Edward R. Stettinius, Jr., who was expected to testify against the Cox amendment later in the week before the Senate Military Affairs Committee, already had sent word to members of the Senate that the Cox proposal for establishing a priorities division outside of OPM would be an undesirable change. He was represented as feeling that while the motives of the congressional sponsors of the amendment were commendable, the effect would be to disrupt the existing priorities machinery.

OPM Draws Plan of Percentage Priorities

Washington

•••The Office of Production Management this week was putting finishing touches on a so-called percentage priority plan under which manufacturers of industrial supplies would be assured of sufficient supplies of raw materials to meet defense requirements and at the same time keep distributors' stocks replenished at a level dictated by accelerated defense demand. It was understood that the OPM priorities division shortly will appoint an administrator of the plan.

The plan was described by officials as designed to expedite the distribution of industrial supplies through existing channels despite the inability of manufacturers to know in advance what part of his orders are going into the defense program. In a general way the arrangement contemplates a system whereby a manufacturer or distributor in placing orders would be assured of quantities equal to those purchased under normal circumstances, plus an additional amount necessary to meet the demand stimulated by defense production.

While the arrangement was said to stimulate certain features of the blanket preference ratings and the inventory control systems, the percentage priority plan was described as necessary to fill a need not being met by the two systems already in operation.

In the case of the blanket preference ratings, the priorities division has found it necessary where there is a real shortage of a product or material to take control of the entire supply of such product in order to protect the further needs of the defense program. Under such circumstances, the division issued blanket preference ratings, which directed that only defense orders, direct or indirect, be filled except as fractions of the supply are released.

The blanket preference rating system was adopted after the priorities division found that a priorities system based solely on preference ratings to individual contracts was sluggish, and ineffective as a method of conserving the supply. The division encountered the same difficulties in a wide range of products,

including electric motors, small tools, many accessories and parts.

The inventory control order, which was made effective May 1, was adopted as a method for guarding against excessive inventories. It is part of a coordinated program aimed at developing broad regulations in the interests of national defense. Thus far it has been made applicable to 16 metals and classes of metals.

Under the system, both suppliers and customers are required to reduce shipments to over-stocked customers and file compliance statements with the OPM.

Heavy Construction Down 16% in April

•••Volume of heavy engineering construction awards placed in April dropped 16 per cent to \$381,563,000 from \$452,430,000 in March, *Engineering News-Record* reports. Despite the drop from the March level, the April total was the highest on record for that month. In April a year ago awards totaled \$211,816,000.

Private awards increased to \$121,863,000 in April from \$77,417,000 in the preceding month, but public construction dropped to \$259,700,000 in April from \$375,013,000 in March.

Total awards made in the first four months of the current year amount to \$1,842,811,000, a gain of 116 per cent over the 1939 total figure. Private work for the four-month period is 71 per cent above a year ago, while public construction shows a gain of 140 per cent.

7-Year Strike Against Kohler Co. Finally Settled

Milwaukee

•••A seven-year strike by the AFL union against Kohler Co., Kohler, Wis., has been settled. The union has maintained picketing at the plant since July, 1934, although production was resumed in September of that year, less than three months after a riot in which two men were killed and 22 wounded before the national guard marched in and restored order. An independent union now holds the bargaining contract.

12,000 Idle in West Coast AFL-CIO Strike

San Francisco

•••Twelve thousand men are idle in the San Francisco Bay area as a result of a strike of 1700 AFL and CIO machinists who have tied up work on \$500,000,000 of Navy, Maritime Commission and merchant ship contracts.

The strikers, who seek a wage rate of \$1.15 an hour for journeymen as against \$1.12 established by the coastwise stabilization agreement signed last month, have rejected an OPM request that they return to work pending settlement of disagreements.

Both the AFL and the CIO had previously stated they would observe the agreement, and the AFL Bay Cities Metal Trades Council has not sanctioned the strike.

The San Francisco plants closed include Bethlehem, United Engineering, General Engineering & Drydock, Matson Navigation Co. repair shops, Moore Drydock Co., Pacific Drydock Co. and others.

Byers to Begin Making Electric Steel June 15

Pittsburgh

•••A. M. Byers Co. will enter the field of alloy steel manufacture about June 15, when its new electric furnace equipment will be placed in initial operation. Available alloy steel production for America's defense needs will then be increased by another 30,000 to 40,000 tons a year, according to L. F. Rains, president.

Fore River Shipyard Employment Rises to 15,000

William H. Collins, general manager of the Fore River Yard of the Bethlehem Steel Co., reveals that employment there has hit the 15,000 mark as a result of an intensive training program. It had previously been expected that not more than 12,000 men would be employed by this time. Noting that the capacity of the yard to build capital ships would be tripled by the end of 1941, he said this would be done about three months ahead of schedule.

Defense Dominates Triple Mill Supply Meeting at Chicago

Chicago

• • • Production of enough equipment for defense is more important than "convoying, leasing and lending," H. K. Clark, vice-president, Norton Co., Worcester, Mass., said last week at the Triple Mill Supply meeting in Chicago. Government bureaucracy and lack of appreciation of the acute problems facing the nation are impeding the defense program, Mr. Clark said. It is not realized, he said, that the U. S. is up against an unprecedented emergency.

Several hundred manufacturers and distributors attended the convention, held by the National Supply & Machinery Distributors' Association, the American Supply & Machinery Manufacturers' Association and the Southern Supply & Machinery Distributors' Association.

Defense and the mill supply distributor's place in helping to arm the nation dominated discussions at the convention, which heard Mason Britton, of the OPM Production Division, tool section, declare that government, management and labor must speedily join hands in supporting defense. Germany, Mr. Britton warned, is spending \$20 billions for arms while the U. S. will spend only \$6 billions in the fiscal year ended June 20, 1941.

By fall six plants will require 30,000,000 lb. of brass monthly, and the airplane building program will face additional tool requirements of \$300,000,000 for 1942, the OPM executive said. H. F. Seymour, also of the OPM Production Division, said that one manufacturer has increased production 25 per cent by dropping 12 items from his list of products.

S. W. Gibb, of the Yale & Towne Mfg. Co., Philadelphia, predicted that if steel prices are increased, prices of electric hoists and chain blocks made by his company will increase, as will other products of other companies.

Unless priorities are worked out still more carefully, there may be an even greater shortage of cutting tools, W. E. Caldwell, Cleve-

Subcontracting Can Be Forced By U.S. J. L. Trecker Warns

Washington

• • • New measures, if necessary, to increase defense subcontracting were advocated by Joseph L. Trecker, OPM Co-chief of Subcontracting for the Defense Contract Service, in an address read Monday at a regional meeting of the National Association of Manufacturers in San Francisco. He warned that subcontracting could be enforced by government decree, priorities or other "restrictives or accelerating means."

Declaring that "the very existence of our country is at stake in the emergency," Mr. Trecker estimated that not more than 50 per cent of the country's productive capacity either from the standpoint of the number of machines or total volume of machine hours available is being used.

land Twist Drill Co., Cleveland, said. Approximately 75 per cent of all cutting tools now go directly or indirectly into defense work, Mr. Caldwell said.

R. G. Lufkin, president, Lufkin Rule Co., Saginaw, Mich., was elected president of the American Supply & Machinery Manufacturers' Association, while H. P. Ladds, of the National Screw & Mfg. Co., Cleveland, was elected first vice-president and A. A. Murfey, Cleveland File Co., was chosen second vice-president. A.

Nickel Steel Rivet Output for Tanks Up

Cleveland

• • • Production of nickel steel rivets for Army tanks is rising and much higher volume will be required when the seven principal tank builders get into full operation later this year, according to Champion Rivet Co. here.

These rivets, which are made of SAE 2315 steel, call for an unusually high degree of workmanship. Close tolerances are vital because of the fact that they are being used on armor plate. Some are driven cold and others hot, depending on preference of the tank builder.

C. Kingston was elected treasurer and R. Kennedy Hanson will continue as general manager.

H. V. Waterman, Hendrie & Boltoff Mfg. & Supply Co., was elected president of the national distributors' organization, with Andrew G. Carey, Carey Machinery & Supply Co., Baltimore; Carl A. Channon, Great Lakes Supply Corp., Chicago, and A. J. Glesener, A. J. Glesener Co., San Francisco, as vice-presidents.

President of the southern association is J. B. Crimmins, Mills & Lupton Supply Co., Chattanooga, Tenn.; and Howard M. Schramm, Mobile, Ala., and P. Pidgeon, Memphis, Tenn., vice-presidents.

U.S.-Financed Defense Plants Near \$2 Billions

Washington

• • • The OPM announced on Monday that the government had committed itself by March 30 to pay for \$1,915,000,000 of new factory facilities in building an "arsenal of democracy." The money is being used to construct plants and machinery to turn out airplanes, guns, tanks, machine tools and other defense equipment. All commitments of the government, plus private financing under certificates of necessity, total \$2,892,000,000. If to this are added British commitments for plant facilities in the United States amounting to \$191,000,000, the total reaches \$3,083,000,000.

1000 Register on First Day of A.F.A. Meeting

New York

• • • Close to 1000 members and guests registered on the first day of the annual convention of the American Foundrymen's Association, being held here at the Hotel Pennsylvania. With defense work keynoting the numerous technical sessions, association officials report attendance at the meetings as the largest in many years.

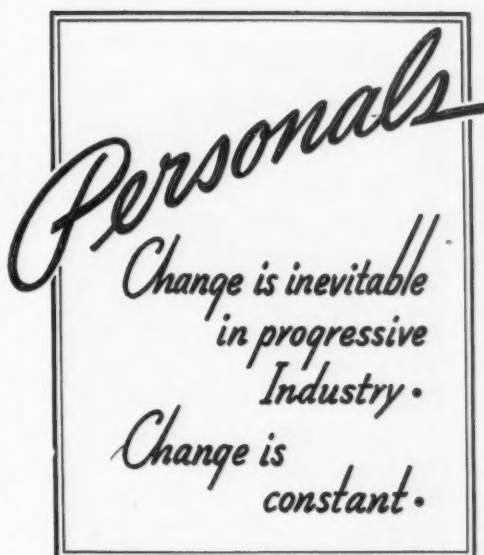
At the annual chapter officers meeting on Monday, the Wisconsin chapter was awarded a trophy for acquiring the largest number of new members in recent months.

• **John H. Collier** has been elected president of the Crane Co., Chicago, succeeding the late Charles B. Nolte. Mr. Collier has been vice-president of the company for the past eight years and also a director. He started with the firm 38 years ago as a foundry helper. In 1929 he went to Paris as president of the company's French subsidiary. For the next four years he served in that capacity and also as chairman of the English subsidiary. He was recalled to this country in 1933 and made vice-president in charge of manufacturing, the position he has held until his recent election to the presidency.

• **George A. Whitehurst**, for the last five years Chicago district industrial engineer of Carnegie-Illinois Steel Corp., Pittsburgh, has been promoted to the position of assistant to chief engineer of the United States Steel Corp. subsidiary. His headquarters will be in Pittsburgh. Mr. Whitehurst has been with the corporation since July, 1931, when he joined the former Carnegie Steel Co. at Pittsburgh. He worked in the industrial engineering department of United States Steel Corp. at New York from December, 1933, to April, 1935, when he was transferred to the Chicago district industrial engineering office of Carnegie-Illinois Steel Corp. On Oct. 1, 1935, he became district indus-



JOHN H. COLLIER, president, Crane Co., Chicago.



trial engineer, the position he has held until his current promotion.

• **Peter E. Sance** has been appointed works manager of the Allenport division of Pittsburgh Steel Co., Pittsburgh, succeeding **F. N. Gilmore**, who is retiring. Mr. Sance formerly was superintendent of finishing departments at Allenport.

• **Dan L. Graef** has been named production manager of the Cleveland plant of Thompson Products, Inc., succeeding **Al Gorris**.

• **A. M. Smart**, general manager, Conneaut Can Co., Conneaut, Ohio, has been elected president succeeding **H. A. Truesdale**, who has retired after 40 years of service.

• **J. E. Scadenn** has been appointed Pacific Coast manager of Minneapolis Steel & Machinery Co., division of Minneapolis-Moline Power Implement Co. Coast headquarters will continue in the Chapman Building, Los Angeles. Mr. Scadenn succeeds the late **M. H. Hanauer**, to whom he was assistant for the past 12 years.

• **Walter Nuttall** has been appointed general purchasing agent for the Blaw-Knox Co., Pittsburgh. **J. E. McWilliams** has been made division purchasing agent of the Blaw-Knox division.

• **John D. Sullivan**, chief chemist, Battelle Memorial Institute, Columbus, Ohio, has been elected chairman of the Electrothermic division of the Electrochemical Society, an international group of industrial scientists.

• **R. E. Griffin** has been named production manager in charge of all the defense projects being carried on by Oldsmobile division of General Motors Corp. Mr. Griffin will have charge of both shell and machine gun manufacture, working directly under **S. E. Skinner**, general manager. **H. J. Cupper**, former Detroit zone manager, will be assistant defense production manager under Mr. Griffin. **K. C. Plasterer**, former forge plant manager, has been named manufacturing manager of defense plants; **J. G. Hickman**, Olds engineer, as standards engineer; **C. B. Dakin**, former assistant manager of the forge plant, as defense plant manager, and **J. H. Alfes**, former chief inspector, as plant manager of the gun division.

• **George C. Paterson**, resident manager of Fisher Body plant No. 1, in Flint, Mich., since 1937, has been named general manager of all Fisher Body assembly plants in the country. He has been manager of Fisher plants for the past 18 years. His successor at plant No. 1 will be **James E. Goodman**, who has been assistant resident manager.

• **Albert J. Proctor** has been elected president of the Flint Industrial Executives Club. He has served 30 years with the AC Spark Plug division of General Motors



GEORGE A. WHITEHURST, assistant to chief engineer, Carnegie-Illinois Steel Corp., Pittsburgh.

and is superintendent of AC Spark Plug division. Other officers elected by the Industrial Executives Club are **Cecil P. Nankervis**, plant engineer of Fisher Body division, vice president; **Fred Pyper**, general master mechanic of Buick Motor division, treasurer, and **Earl Van Dyke**, manager of the sheet metal division of Chevrolet, secretary.

- **Charles R. Rall** has been elected president and treasurer of the Pittsburgh Piping & Equipment Co., Pittsburgh. Other new officers are: **Louis K. Hamilton**, vice-president; **Joseph G. Gardner**, secretary; **Karl F. Tiegel**, director of purchases and estimates, and **G. Sinding Larsen**, chief engineer.

- **F. F. Seaman**, general manager, Robbins & Myers, Inc., Hoist & Crane division, Springfield, Ohio, has been elected chairman of the Electric Hoist Manufacturers Association, succeeding **H. S. Strouse** of the Harnischfeger Corp. **A. S. Watson**, vice-president, Detroit Hoist & Machine Co., Detroit, was elected vice-chairman.

- **Ervin Manske**, who started with Allis-Chalmers Mfg. Co., Milwaukee, in 1910 as a stenographer in the shipping department, has just been appointed general traffic manager of the company's eight



GEORGE K. LEET, secretary, United States Steel Corp., Pittsburghs, whose retirement was announced in THE IRON AGE of May 8, p. 127.



WILLIAM AVERELL BROWN whose election as secretary to replace Mr. Leet was made known at the same time.

plants, with headquarters in Milwaukee. Mr. Manske was transferred to the home office traffic department in 1913, serving successively as stenographer, clerk, rate clerk and chief clerk, and since 1929 as assistant general traffic manager under the late Frederick C. Bryan, whom he now succeeds. **Carl J. Kraus**, traffic manager at Allis-Chalmers' Springfield, Ill., plant, has been appointed assistant general traffic manager and is being transferred to Milwaukee.

- **Arthur L. Armantrout** has been appointed superintendent of industrial relations of the Lorain division of Carnegie-Illinois Steel Corp. at Johnstown, Pa. He has been superintendent of industrial relations at South Works, Chicago, since 1938. Mr. Armantrout, a graduate of Purdue University, entered the service of the corporation in the physical laboratory at South Works in 1933 and two years later became a test engineer. He was made director of training in 1936 and in 1937 became assistant superintendent of industrial relations. A year later he was named superintendent of industrial relations at South Works.

- **Roy S. Laird**, who has been with the Ohmite Mfg. Co., Chicago, five years as sales engineer, has been named sales manager of the com-

pany. Mr. Laird is an electrical engineering graduate of the University of Illinois.

- **William L. Ludwick** has been appointed chief engineer of the instrument division, Thomas A. Edison, Inc., West Orange, N. J. Mr. Ludwick graduated from King's College, London University, with mechanical and electrical engineering degrees and came to the United States in 1923. For a number of years he was associated with the Brown Instrument Co. From 1932 to 1936 he was consulting engineer on industrial instrumentation and control to the U.S.S.R. While engaged in this work he built and placed in operation two plants for the manufacture of industrial instruments. Later he was chief engineer of Negretti & Zambra, Ltd., in London. Mr. Ludwick goes to Thomas A. Edison, Inc., from Farnsworth Television & Radio Corp., where he was chief mechanical engineer in charge of commercial design of television transmitter and high frequency apparatus.

- **Arthur Walsh**, executive vice-president of Thomas A. Edison, Inc., West Orange, N. J., has been named to succeed to the duties left by the retirement of **Charles Sumner Williams**, chairman of the board. Mr. Walsh started with



L. H. BURNETT, senior vice-president, Carnegie-Illinois Steel Corp., Pittsburgh, who has retired as announced in THE IRON AGE of May 1, p. 117.

Thomas A. Edison, Inc., as a concert violinist in 1915 and was associated with the phonograph division from 1924 to 1931. He has been a vice-president on the general staff and a director since 1931. On leave of absence in 1934 and 1935, he served as New Jersey director of the Federal Housing Administration and was a department administrator in Washington, D. C., and later assistant administrator. He was promoted from executive vice-president to the office of president of several affiliates including the following companies: Edison-Splitdorf Corp., Ediphone Co., Edison Storage Supply Co., and Thomas A. Edison of Canada, Ltd.

• **Don T. Flater**, formerly works manager of the Chrysler-Jefferson plant, has been appointed general staff master mechanic of Chrysler Corp., Detroit. Mr. Flater will replace **F. J. Morissette**, who has just been placed in charge of the Chrysler gun arsenal and among his many duties will serve as the corporation's expert on machinery and its operation. In 1915 after graduating from high school in Waterloo, Iowa, Mr. Flater joined the John Deere Tractor Co. in Waterloo as a clerk and inspector. In 1917 he joined the United States Army and served with the medical corps and motor transport division until 1919, when he again became associated with the John Deere Co. During the next 13 years, in addition to taking night school work in engineering and design and extension courses from the University of Iowa, Mr. Flater worked as a machine operator, tool and die maker, foreman, tool engineer, master mechanic and finally was placed in charge of planning and carrying to a successful conclusion the construction of the John Deere wheel manufacturing plant, including a forge, foundry and machine shop. In 1932 he became state manager for the Ben Hur Life Insurance Co. of Portland, Ore., which position he held until 1934, when he joined Chrysler Corp. as a foreman in the Jefferson Avenue machine shop. After several months he became assistant supervisor in the machine shop, then time study supervisor and finally works manager of the entire Jefferson plant in 1936.

Obituary

• **Charles Bernhardt Jahnke**, president and general manager of the Cooper-Bessemer Corp., died in Mount Vernon, Ohio, on May 6, aged 52 years. Mr. Jahnke was for 21 years associated with Fairbanks, Morse & Co. In 1931 he joined the International Harvester Co. Four years later he became affiliated with the Cooper-Bessemer Corp. as its chief engineer.



THE LATE C. B. Jahnke, president and general manager, Cooper-Bessemer Corp., Mount Vernon, Ohio.

- **Oscar B. Mueller**, 70 years old, founder of the Mueller Brass Co., Port Huron, Mich., died April 24 at his home in Bradenton, Fla. Mr. Mueller founded his brass foundry at Port Huron to make war munitions during the last war, having previously been in business in Decatur, Ill. He severed his connection with the Mueller Co. about three years ago and since that time has made his home in Florida.
- **Steven D. Briggs**, active in the automobile industry for more than 25 years, died recently at Laguna Beach, Cal. He was 61 years old. Mr. Briggs was at one time

foreign sales representative of the Hupp Motor Car Co. and for 10 years he was European manager for Chrysler Corp.

- **William T. Randall**, Philadelphia sales engineer of the Pangborn Corp., Hagerstown, Md., since 1919, died on April 14 at his summer cottage at Pittsfield, Vt. A native of New England, Mr. Randall was 57 years old.
- **Luther Little**, one of the founders and a former partner of A. Milne & Co., New York and Boston, died on April 26. He was 89 years old.
- **Charles S. Anders**, vice-president and general superintendent of the Rundle-Spence Mfg. Co., Milwaukee, died at his home there April 30 at the age of 76. He had completed nearly 60 years of service with the firm.
- **Henry Charles Paape**, connected with the engineering department of the A. O. Smith Corp., Milwaukee, died April 29 at his home in Milwaukee.
- **Robert E. Schlegel**, owner of Ideal Pattern Works, Cincinnati, and president, American Pump, Inc., died at his home in that city, April 29. Mr. Schlegel was 48 years old.
- **Frazier L. Stevenson**, Cleveland district sales manager for the Vanadium Alloy Steel Co., died at his home May 1. He was 46 years old. Mr. Stevenson, who had been associated with the company for 22 years, was a native of Pittsburgh.
- **Robert F. Herrick, Jr.**, who had served as vice-president of the Essex Wire Corp., Detroit; vice-president of Scott & Williams, Inc., Laconia, N. H.; and director of Saco-Lowell Shops, Boston, died in Boston on May 1. Mr. Herrick was born in Milton, Mass., 47 years ago.
- **Frederick Felix Curtze**, aged 83 years, chairman of the board of the Columbian Carbon Co., died May 7. He also was president of the Union Iron Co., Heisler Locomotive Works and the Erie Mfg. & Supply Co., all of Erie.
- **Robert Emmett Schlegel**, founder and president of the Ideal Pattern Works & Foundry Co., Cincinnati, died at his home recently. He was 48 years old.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	May 13, 1941	May 6, 1941	Apr. 15, 1941	May 14, 1940
Flat Rolled Steel: (Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10

Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10

Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)				
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00

Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 123-132 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron:

	May 13, 1941	May 6, 1941	Apr. 15, 1941	May 14, 1940
(Per Gross Ton)				
No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.84	\$24.84
No. 2, Valley furnace....	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti....	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†.	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa...	25.34	25.34	25.34	24.34
Basic, Valley furnace ...	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago..	31.34	30.34	30.34	30.34
Ferromanganese†	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:

	May 13, 1941	May 6, 1941	Apr. 15, 1941	May 14, 1940
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$18.75
Heavy melt'g steel, Phila.	18.75	18.75	18.75	17.25
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	16.75
Carwheels, Chicago .....	.....	.....	.....	18.25
Carwheels, Philadelphia..	.....	.....	.....	20.75
No. 1 cast, Pittsburgh...	22.00	23.25	23.25	18.75
No. 1 cast, Philadelphia..	24.00	24.00	24.00	20.25
No. 1 cast, Ch'go*	*21.00	*22.60	*22.60	16.25

*Changed to gross ton basis.

Coke, Connellsville:

	May 13, 1941	May 6, 1941	Apr. 15, 1941	May 14, 1940
(Per Net Ton at Oven)				
Furnace coke, prompt...	\$6.125	\$5.625	\$5.625	\$4.00
Foundry coke, prompt...	6.875	6.25	6.25	5.25

Non-Ferrous Metals:

	May 13, 1941	May 6, 1941	Apr. 15, 1941	May 14, 1940
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*..	12.00	12.00	12.00	11.50
Copper, Lake, New York.	12.00	12.00	12.00	11.50
Tin (Straits), New York	52.25	52.00	52.125	53.00
Zinc, East St. Louis.....	7.25	7.25	7.25	5.75
Lead, St. Louis	5.70	5.70	5.70	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

Composite Prices

	High	Low
May 13, 1941.....	2.261c. a Lb.....	2.261c. a Lb.....
One week ago.....	2.261c. a Lb.....	2.261c. a Lb.....
One month ago.....	2.261c. a Lb.....	2.261c. a Lb.....
One year ago	2.211c. a Lb.....	2.211c. a Lb.....

	High	Low
1941.....		
1940.....	2.261c., Jan. 2	2.211c., Apr. 16
1939.....	2.286c., Jan. 3	2.236c., May 16
1938.....	2.512c., May 17	2.211c., Oct. 18
1937.....	2.512c., Mar. 9	2.249c., Jan. 4
1936.....	2.249c., Dec. 28	2.016c., Mar. 10
1935.....	2.062c., Oct. 1	2.056c., Jan. 8
1934.....	2.118c., Apr. 24	1.945c., Jan. 2
1933.....	1.953c., Oct. 3	1.792c., May 2
1932.....	1.915c., Sept. 6	1.870c., Mar. 15
1931.....	1.981c., Jan. 13	1.883c., Dec. 29
1930.....	2.192c., Jan. 7	1.962c., Dec. 9
1929.....	2.236c., May 28	2.192c., Oct. 29

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
May 13, 1941.....	\$23.61 a Gross Ton.....	\$23.61 a Gross Ton.....
One week ago.....	\$23.61 a Gross Ton.....	\$23.61 a Gross Ton.....
One month ago.....	\$23.61 a Gross Ton.....	\$23.61 a Gross Ton.....
One year ago	\$22.61 a Gross Ton.....	\$22.61 a Gross Ton.....

	High	Low
1941.....		
1940.....	23.45, Dec. 23	22.61, Jan. 2
1939.....	22.61, Sept. 19	20.61, Sept. 12
1938.....	23.25, June 21	19.61, July 6
1937.....	23.25, Mar. 9	20.25, Feb. 16
1936.....	19.74, Nov. 24	18.73, Aug. 11
1935.....	18.84, Nov. 5	17.83, May 14
1934.....	17.90, May 1	16.90, Jan. 27
1933.....	16.90, Dec. 5	13.56, Jan. 3
1932.....	14.81, Jan. 5	13.56, Dec. 6
1931.....	15.90, Jan. 6	14.79, Dec. 15
1930.....	18.21, Jan. 7	15.90, Dec. 16
1929.....	18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
May 13, 1941.....	\$19.17 a Gross Ton.....	\$19.17 a Gross Ton.....
One week ago.....	\$19.17 a Gross Ton.....	\$19.17 a Gross Ton.....
One month ago.....	\$19.17 a Gross Ton.....	\$19.17 a Gross Ton.....
One year ago	\$17.58 a Gross Ton.....	\$17.58 a Gross Ton.....

	High	Low
1941.....		
1940.....	22.00, Jan. 7	19.17, Apr. 10
1939.....	21.83, Dec. 30	16.04, Apr. 9
1938.....	22.50, Oct. 3	14.08, May 16
1937.....	15.00, Nov. 22	11.00, June 7
1936.....	21.92, Mar. 30	12.92, Nov. 10
1935.....	17.75, Dec. 21	12.67, June 9
1934.....	13.42, Dec. 10	10.33, Apr. 29
1933.....	13.00, Mar. 13	9.50, Sept. 25
1932.....	12.25, Aug. 8	6.75, Jan. 3
1931.....	8.50, Jan. 12	6.43, July 5
1930.....	11.33, Jan. 6	8.50, Dec. 29
1929.....	15.00, Feb. 18	11.25, Dec. 9
1928.....	17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

ALTHOUGH pressure for shipments of steel is more intense than ever, the volume of new bookings has declined somewhat in important centers, probably because of the following factors: The possibility of mandatory priorities on all forms of steel, which would automatically curtail shipments to consumers not engaged in defense work even though their orders are on the books; the inventory control plan inaugurated by the Office of Production Management, which will discourage excessive buying and which, if necessary, could be employed to commandeer excessive stocks, and the fact that most steel companies are fully committed for all the steel they can produce in 1941, and if they accept orders for 1942 are doing so conditionally.

Passage of the pending priorities bill by Congress, which is expected this week, will give statutory authority for the priorities system, and under this act the control of strategic materials, including iron and steel, may be as comprehensive as it was under the War Industries Board in the 1917-18 period.

THE inventory control plan, officially known as General Metals Order No. 1, does not become fully effective until June 1, but already producers of various products which come under the order have been asked to reduce shipments this month which would tend to increase customers' inventories. The affidavits which both suppliers and their customers must furnish to the OPM Division of Priorities commencing June 10 with respect to all orders will create a vast amount of new paper work for steel companies, some of which will set up new departments to handle this work.

Opposition to a mandatory priority system is less pronounced in the iron and steel industry than it was a few months ago. The problem created for all steel companies by the tremendous pressure from non-defense consumers on the one hand and the growing requirements for the defense program can perhaps be solved only by the interposition of mandatory separation of the essential and the unessential.

THE steel industry emphatically does not believe that the problem can be solved in sufficient time by an enormous expansion of steel making capacity, expressed in Washington in terms of 30,000,000 tons of steel and 10,000,000 tons of pig iron annually. Such expansion could not be completed in less than a year to a year and a half under more favorable conditions than at present exist. Shops equipped to build the necessary equipment are filled up with essential work for some time ahead. To cite just one item, blast furnace blowers could not be built in less than 15 months unless new shops were created. To provide sufficient ore for such an expansion would require the building of new

• Possibility of mandatory priorities, adoption of inventory control plan and sold-up condition of mills slow up new steel orders somewhat . . . Large expansion, advocated in Washington, could not be completed in less than year to year and a half. New scrap price schedule issued.

lake freighters. Moreover, it is becoming apparent that the supply of scrap may not even be sufficient for present steel making capacity. Rationing and requisitioning of scrap may soon become necessary to prevent steel plants, foundries, and rail steel mills, from running short.

After a period of trial and error, the Office of Price Administration and Civilian Supply has issued an amended price schedule on iron and steel scrap, naming ceiling prices for 34 consuming districts as against 13 in the former schedule. While the new schedule has corrected some of the inequalities and ambiguities of the one previously issued, fresh problems have been created which may call for further amendments. One of the serious situations is the apparent inability of the British to obtain sufficient scrap to load boats which are waiting at Atlantic Coast ports.

Steel export trade is still marking time to a large extent while exporters await a ruling from the Price Administrator as to whether ceiling prices for export shall be the official prices of the Steel Export Association of America that were in effect on March 31 or domestic prices. Export prices were generally above the domestic level. In Washington a plan is being considered to allocate about 2,000,000 tons of steel a year to Western Hemisphere countries other than Canada.

THE Carnegie-Illinois Steel Corp. has announced that the present tin plate price of \$5 a base box will remain in effect on all shipments to Sept. 30, 1941.

Charcoal pig iron producers have announced an advance of \$1 a ton, effective at once.

Ingot production has made a further gain this week to 99.5 per cent of capacity, closely approaching the rate in the last week of March, just prior to the coal strike. The Pittsburgh district has gained four points to 100 per cent. In the Chicago district Carnegie-Illinois now has 21 of its 23 blast furnaces in operation and expects to start the other two soon.

The Industrial Pace . . .

A general quickening in operations in the durable goods industries was apparent in the past week as industry endeavored to recover valuable ground lost during the coal strike. Outstanding recovery was in steel and allied fields. A new factor in evidence in past week was surge of anticipatory buying of automobiles which forced car production in the week to new record of 132,380 units. Normal seasonal influence, coupled with sustained heavy demand for lumber, caused another rise in carloadings of lumber products.

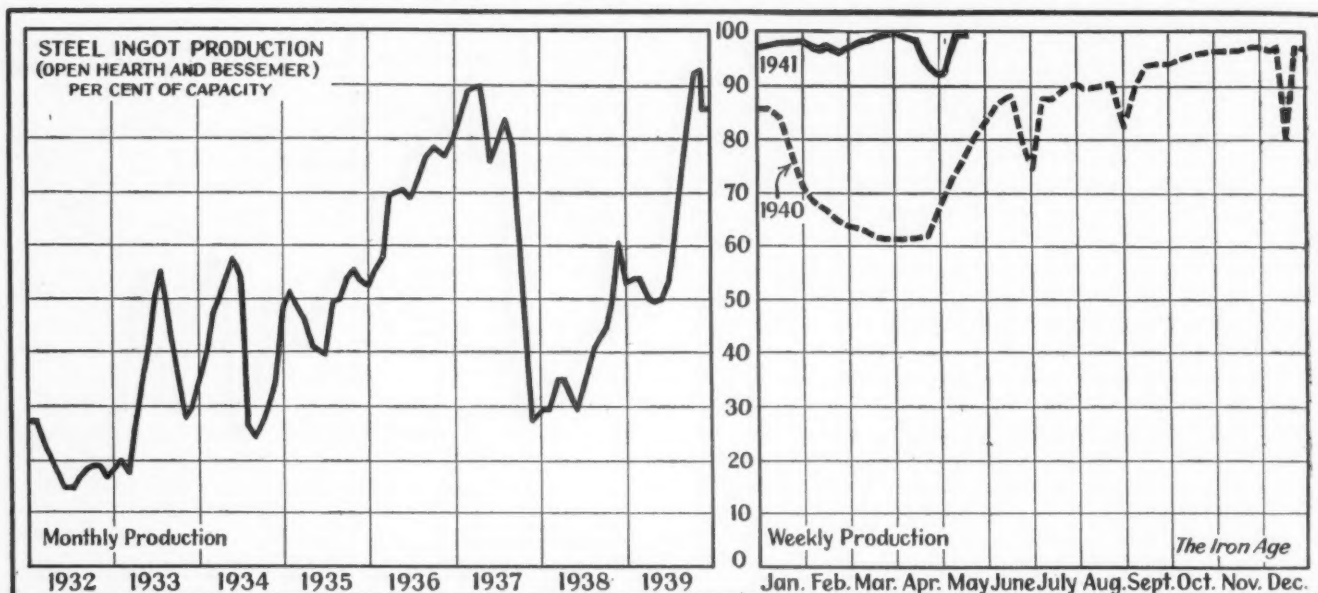
This increase in production was reflected in a rise of 3.9 points in THE IRON AGE capital goods index to 109.4. While the past week's index represents a gain of 6.5 points from

the April low, it is still some 10 points below the pre-strike level.

Only factor of the index going counter to the general trend is volume of heavy engineering construction awards. This condition, however, is most likely only temporary. Large new plant construction plans encompassed by Lease-Lend bill are still in blueprint stage, but will shortly make themselves felt in the building picture.

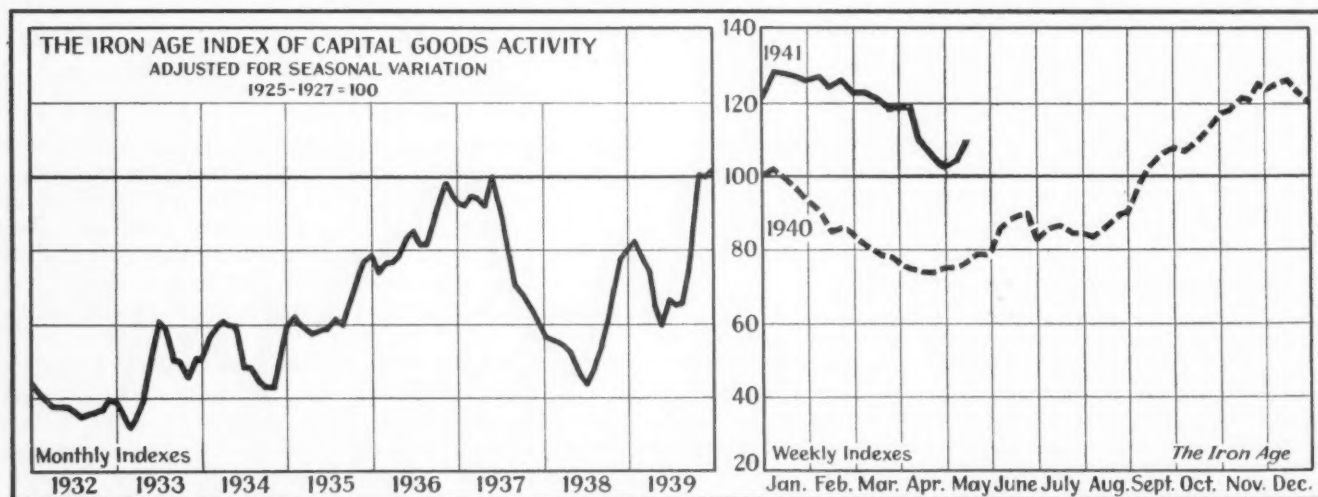
Despite steadily rising production costs, prices of metals and metal products show little change thus far this year, as accompanying chart shows. Stabilization efforts are also apparent in scrap composite prices which are holding at the year's lowest levels.

Steel Output Gains 2 Points to 99.5 %



District Ingot Production, Per Cent of Capacity		Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
Current Week ..		100.0	102.0	97.0	96.0	97.0	104.5	85.0	104.0	99.0	101.5	102.5	111.0	101.5	99.5
Previous Week..		96.0	101.5	98.0	96.0	99.0	104.5	85.0	101.0	95.0	100.0	102.5	111.0	101.5	97.5

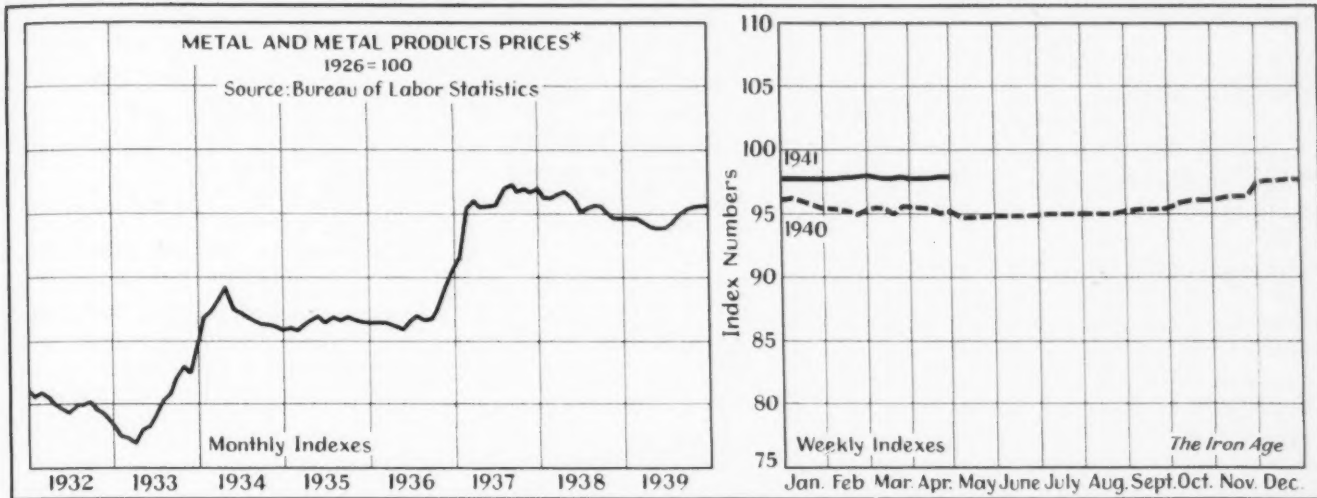
Capital Goods Index Gains More Ground



Sources: ¹ THE IRON AGE; ² Ward's Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended April 26. Other indexes cover week of May 3.

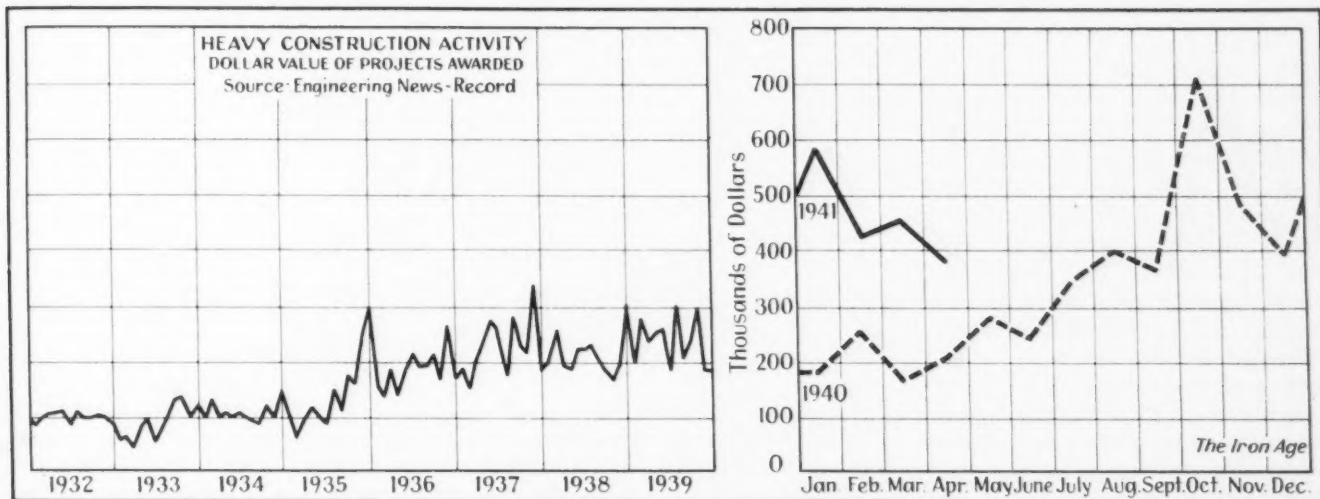
Component	Week Ended → May 10	May 3	Apr. 12	May 11 1940	May 11 1929
Steel ingot production ¹	130.7	126.0	131.5	86.2	128.5
Automobile production ²	110.7	108.1	83.2	82.3	127.4
Construction contracts ³	121.2	128.6	147.5	63.1	123.1
Forest products carloadings ⁴	75.3	71.6	69.2	55.1	115.4
Pittsburgh output and shipments ⁵	109.1	93.4	106.9	85.5	124.3
COMBINED INDEX	109.4	105.5	107.7	74.4	123.7

Steady Metal Prices Reflect Stabilization Efforts

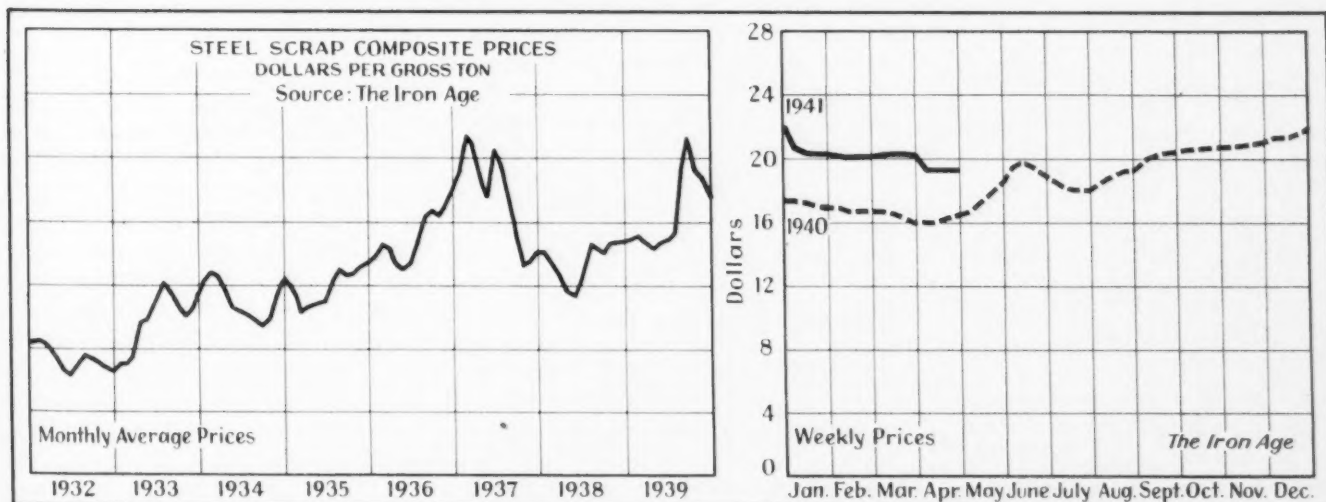


* Based on 147 items, including iron, steel, non-ferrous metals, and finished products and agricultural equipment, automobiles, tools, bolts, etc.

Construction Awards Decline 16% in April



Scrap Price Holds At Year's Low Point



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Orders for steel lighter at Pittsburgh and Cleveland

A slight dip in new order volume in the past week is not considered significant at PITTSBURGH in view of tremendous tonnages pending on known projects. Incoming orders are in excess of shipments. New business, including defense and culled commercial demand represents the "cream of the crop." Some mills are forced to turn down business from other than regular customers owing to "must" commitments which tax their capacities.

An expected influx of British orders next month, the certainty that freight car material bookings will expand rapidly, the proximity of munition steel business in huge lots, and the pressure of customers for deliveries of steel now on order books, presents a cross-section of the PITTSBURGH steel picture.

New orders for steel dropped at CLEVELAND last week. However, outside of helping emphasize the booked-up condition of mills, the decline held little or no importance. Certain to arise over the next few months are heavy purchases of shell material, tin plate, tubular goods, and steel for shipbuilding and factory construction in addition to railroad requirements.

The steel industry's swing toward total defense production has been hastened somewhat by government requests for deliveries earlier than originally specified when awards were made. Expeditors representing government departments have been in CLEVELAND recently seeking to quicken shipments.

Among the many changes being forced among steel consumers at CLEVELAND and other points, several companies with customers on the Pacific Coast are beginning to ship products by all-rail instead of by ocean vessels. The development arises through a growing scarcity of coastwise bottoms.

With every steel consumer in the greater CHICAGO district operating at all-time highs, customers' inventories there are estimated by

one mill to average slightly less than 30 days. The range is figured at from 15 to 60 days. The number and total tonnage of orders dropped in the past week. This is explained by the fact that most mills are fully committed for 1941. While some producers are freely accepting 1942 orders from both defense and non-defense, others are accepting only defense business and some are shying away from 1942 allocations of any kind.

Indicative of the general situation is the fact that CHICAGO warehouses are reporting each month's business as the record-breaking month in history; one house had to turn down more than 25 per cent of the tonnage offered it during the past three weeks.

Piling orders, practically all for defense—are exceptionally heavy. Plates and structural shapes are getting the greatest defense pinch. Alloy business is well ahead of shipments with automotive taking more than preparedness orders.

Bookings continue to run ahead of shipments at BIRMINGHAM and producers now are taking orders on some items for 1942 delivery.

With no slackening of the buying pace in sight, sellers in the Philadelphia area are imposing progressively tighter restrictions on civilian business. Despite these restrictions, volume of new bookings in the past week was still substantially in excess of shipments. The problem of supplying the railroads is becoming increasingly difficult. One large railroad has been purchasing ingots and slabs from one maker and shipping them to several smaller mills for rolling into shapes and plates. New tin plate orders are extremely difficult to place. Structural fabricating shop activity has tapered somewhat and price competition has developed on several small projects.

Export Buying

... British may take 1,000,000 tons of steel in four months

June requirements for the British are being set at approximately 250,000 tons and it is believed this

amount will also be required for July, August and September. American steel mills must make provision then for 1,000,000 tons of steel products to be shipped to the British during the four summer months. This tonnage excludes tin plate, scrap and pig iron.

It is understood that steel awaiting shipment to Britain, which amounted to about 500,000 tons when shipments were suspended, has been reduced to slightly more than 200,000 tons. There is belief in some quarters that if the steel to be manufactured in June, July, August and September moves out on schedule, requirements for the remainder of the year will be at a somewhat greater rate.

It has been learned that the British cancelled outright approximately 70 to 75 per cent of the carbon steel orders suspended more than a month ago and released the balance for shipment in accordance with the original plans.

Prices

... Tin plate quotations reaffirmed to Sept. 30, 1941

Carnegie-Illinois Steel Corp. on Tuesday, May 13, released the following: "Carnegie-Illinois Steel Corp. today reaffirmed its present price on U. S. S. coke tin plate of \$5 per base box Pittsburgh or Gary for shipment to and including Sept. 30, 1941, for delivery and consumption in the United States. Transportation charges at time of shipment will determine the delivered prices during this period."

This announcement bears out the tradition that first quarter tin plate prices rule throughout the first nine months of the calendar year.

Beehive coke prices have been advanced 50c. a ton, making furnace coke f.o.b. Connellsville quotable at \$6 to \$6.25 a ton, with foundry coke bringing \$6.75 to \$7 a ton. Increased wages are cited for the advance.

A ruling on steel export prices is expected from the Office of Price Administration and Civilian Supply. The question at issue is

whether the official prices of the Steel Export Association of America that were in effect on March 31 or the domestic prices of that date shall be considered to be the ceiling prices for export. The official export prices were higher than domestic prices.

Pig Iron

... Carnegie-Illinois has 21 of 23 furnaces on at Chicago

Carnegie-Illinois Steel Corp. set an all-time record in the CHICAGO district when it placed in operation 21 out of 23 blast furnaces and all batteries of coke ovens—four batteries at Joliet, Ill., and 14 in Gary; each battery contains an average of 70 ovens. It is highly probable that the unprecedented action of blowing in all 23 blast furnaces will take place late this week or early the next.

Sellers at CLEVELAND report marked success in their drive toward the reduction of silicon content in consumers' specifications. Carried out whole-heartedly, this development will serve to speed pig iron production. Preliminary studies of inventories show that neither foundries nor iron producers hold extensive stocks. The expected large scale purchases of railroad equipment which overhang the market will intensify an already tight situation in pig iron.

Wickwire Spencer Steel Co. on May 11 blew in its second blast stack, idle since 1929 and until recently in a bad state of disrepair. The project was completed at a cost of approximately \$450,000 and boosts Wickwire's pig iron capacity to 320,000 tons annually. Addition of this furnace, and the one being prepared for relighting June 1 at the Hanna Furnace Co. plant, is expected to greatly relieve the tight situation which has developed at Buffalo in the last two months. The Wickwire furnace, from which first iron was tapped Tuesday, is being operated under an "arrangement" with the Republic Steel Corp. which is understood to have borne the greater part of the cost of putting it into shape and will receive shipments of iron at its Buffalo mill.

Negotiations for the acquisition of the Delaware River Steel Co. blast furnace at Chester, Pa., are

reported underway between the furnace owners and the Philadelphia Electric Co., which owns land on both sides of the furnace, but no decision has yet been reached. Chief interest at present appears to center in coke ovens at the Chester property.

With foundry operations in the PHILADELPHIA district continuing to rise, the question of altering the present shipment allocation plan is being given serious consideration. Pressure to place forward business is still heavy, but sellers are disinclined to accept such business for the time being. Meanwhile, prospects of easing the present tight supply situation are growing slimmer, with most interests reconciled to the probability that hand-to-mouth operation will be necessary for a long time to come.

Producers of charcoal pig iron announced on Tuesday an advance of \$1 a ton on all grades, effective at once.

Coke

... Beehive production regaining ground lost in strike

A measure of the effect of the bituminous coal strike of last month on beehive coke production is afforded by the latest report of the United States Bureau of Mines. Total production of beehive coke in April (estimated) was 87,100 net tons, compared with March output of 585,600 tons. In the week ended May 3, total production in the United States was 38,900 net tons compared with 6800 tons in the week ended April 26. Pennsylvania production, which was the most seriously affected, rose to 33,600 tons in the week ended May 3 from 4800 tons in the previous week.

Semi-Finished Steel

... Overloaded mill schedules to be further taxed

Overloaded mill schedules will soon receive another jolt when new British requirements are placed for June shipment. The situation will be further complicated by the substantial amount of sheet bars required to fill additional British re-

quests for tin plate. Total semi-finished steel capacity, in conjunction with available steel making capacity, is the keystone of the present undertaking.

Sheets and Strip

... Pressure for deliveries grows heavier

Tremendous pressure is being exerted by automobile companies for delivery of material on mill books while steel companies struggle to meet at least a part of the commercial demand from other users and at the same time make sure defense requirements are being met promptly. Consumers without defense contracts are finding it impossible to obtain as much steel as they want and they are also finding deliveries to them somewhat behind original estimates. This latter trend is expected to be accentuated considerably more than is generally thought within coming months.

On current rolling schedules of strip mills at CLEVELAND defense business is more predominant. Production of all principal units continues just as high as supplies of raw material and annealing capacity will permit. Expediting shipments through reduced annealing time is one step a few consumers have agreed to with little or no loss of efficiency in certain applications.

CHICAGO mills estimate that not more than 10 to 15 per cent of total sheet production in the district is earmarked for defense. Automotive pressure is intense, matched by demands from farm implement and other non-defense buyers. Steel producers believe much more than a 20 per cent reduction in automotive production must take place within the near future. One mill has lengthened delivery promises on wide strip to 10 months, an extension of one month.

The delivery problem of sheet steel is becoming acute in the Southern Ohio district. With third quarter demands now tabulated and booked, mill interests are seeking to scale down commercial demands in an effort to satisfy the regular users as well as defense needs. Domestic users are showing a desire to expand requirements. Although mills are apportioning bookings, the pressure increases almost daily.

Bolts, Nuts and Rivets

... Demand heavy for nickel steel rivets

With the aircraft program expanding and railroad purchases rising, May order volume is excellent at CLEVELAND. A big market is beginning to open gradually for nickel steel rivets for Army tanks and in shipyards some of the idle riveting equipment is now being called on in the rush to complete new vessels.

Wire Products

... Demand increases for alloy wire

Total wire sales at PITTSBURGH continue to run in excess of shipments or production and this trend is expected to continue for some time.

CLEVELAND reports that alloy wire entering into aircraft manufacture and cable for shipbuilding remain in the forefront of demand along with such items as mesh, fence and nails for government construction. The order backlog on nails continues extensive and will be boosted sharply. Stainless nails are practically off the market and difficulty in obtaining certain zinc coated items continues.

Tubular Goods

... 100,000 tons for Plantation line may be awarded soon

Action is expected this week on the Plantation gasoline line to run from Baton Rouge, La., to the Atlantic seaboard. Approximately 1500 miles of pipe will be needed, major portion of which will run from 6 in. to 11 $\frac{3}{4}$ in. and will be capable of 1200 lb. pressure per sq. in. Total steel tonnage will approximate 100,000 tons. The pipe is expected to be allocated soon, and it is believed all major pipe companies will participate. The project has the blessing of the government inasmuch as it presents a national defense aspect in view of tankers being withdrawn from commercial channels for British use. Approximately 200 miles of 12-in. line to run from Portland, Me., to Montreal might be allocated at the same time as the Plantation line.

At CLEVELAND some authorities

indicate that 1941 production of tubular goods may rise to 4,500,000 net tons, more than 500,000 tons ahead of last year's output.

Merchant Bars

... Large tonnages of shell rounds to be needed soon

Commercial customers' deliveries are being pushed back further due to the rapid increase in direct and indirect defense requirements, Pittsburgh reports. Steel makers look for an avalanche of munition steel to make its appearance soon after June 1. If this tonnage is actually as large as expected, commercial supplies and deliveries will be somewhat different than at present.

Specifications at CLEVELAND fell off last week but little or no importance attaches to the development because tremendous tonnages of shell steel are overhanging the market. One company alone indicates that it will probably require 125 tons a day of bars when shell production gets under way in earnest and that its needs will mount to around 250 tons a day later on. Tests on the use of open hearth alloy bar stock for armor piercing bullet cores are reported to have been highly successful.

Despite growing shell demands in CHICAGO, automotive and farm implement buyers are taking vast quantities of bar production from that district. The percentage of total bar production going to defense is lower than popular opinion has it, the approximate portion being around 40 to 50 per cent, according to steel producers there.

Tin Plate

... Decision on supplies for British Empire up to Treasury

Before the procurement division of the Treasury Department makes a final decision on the British request for 420,000 tons of tin plate over the next 12 month period a comprehensive analysis and destination of this tonnage will be studied. If the present commitments to British dominions and other points expected to be serviced are deducted, the increase will amount to roughly 26,000 tons a month. Even this figure is considered to be much greater than American tin plate

makers can fill and still take care of domestic defense and commercial needs. Although the British request may not be fully met in terms of tonnage, a realistic view suggests that a large percentage of the suggested shipments will somehow be furnished. Bearing out the general expectation, Carnegie-Illinois has reaffirmed the present prices on tin plate up to and including the third quarter for shipment within the United States (see announcement under Prices).

Steel companies and can manufacturers have started on a program to comply with the OPM's request for a 10 per cent reduction in the weight of tin coating on cans. The necessary changes in manufacturing practice will result in some increased costs.

Plates

... Railroad and shipbuilding needs complicate rolling schedules

Already devoting about 80 per cent of production to defense orders, CHICAGO plate producers are planning ways and means to take care of expected increased railroad demands, since steel manufacturers there believe railroads will soon get a priority rating. In addition, defense manufacturers there, such as those with tank orders, are slowly swinging into the production stage where more and more plates will be needed steadily.

Continuous strip mills at CLEVELAND, which for some time have been producing large tonnages of light plates each month, are attempting to step up plate production by every possible means. Much of the expected heavy demand for plates from the railroad field can be diverted to high speed mills if necessary in order to relieve rolling equipment needed for production of ship plates.

Commencement of operations at the new Fairfield shipyard of Bethlehem Steel Co., at Sparrows Point, Md., further complicates the plate situation in EASTERN PENNSYLVANIA. In order to supply important defense needs, shipments to civilian users may be sharply curtailed in the near future. Railroads are still endeavoring to increase their allotments, but expect little success unless official preference ratings are granted for such shipments.

Steel Operations

... Further recovery from effects of coal strike achieved

A further recovery in steel production has been achieved this week following the settlement of the coal strike. THE IRON AGE estimates ingot production for the week at 99.5 per cent, which is almost back to the figure of the last week of March before the strike began.

Significant of the strides which steel companies have made, the Carnegie-Illinois Steel Corp. now has 21 of its 23 blast furnaces in the CHICAGO district in full operation and expects to have all 23 furnaces in blast shortly.

A sharp gain in steel production has been made at PITTSBURGH, where the average rate is up four points to 100 per cent. The CHICAGO district has edged up half a point to 102 per cent. Gains have also been made at BIRMINGHAM, DETROIT and in SOUTHERN OHIO. The only losses are at CLEVELAND and YOUNGSTOWN, but these are slight.

Railroad Buying

... Large orders for cars may be placed before July 1

Under a plan worked out by the Association of American Railroads, the American Railway Car Institute and the Office of Production Management, a large volume of orders for cars may be placed before July 1 for construction over the next nine months. Car building plants have been asked to go on a 24-hr. basis, which would enable them to turn out 160,000 freight cars in nine months provided steel and other materials are made available to them through some sort of priority arrangement, which is said to have been promised by the OPM. Standardized car designs would be used and orders would be placed in lots of 5000 each. Smaller roads would pool their orders. All orders would be allocated to various car shops by the American Railway Car

Institute on the basis of the particular types which each shop is most capable of building on a mass production basis.

A breakdown of the steel required by the railroads over the remainder of 1941, as compiled for the OPM by the Association of American Railroads is as follows:

Freight car builders are still worrying about steel supplies to be used for equipment already on the order books. In addition to the two car shops mentioned in THE IRON AGE last week as being down for lack of supplies, another freight car builder has had to suspend operations of his fabricating plant until steel is rushed to him.

This week 2000 freight cars and 10 locomotives were ordered.

Chicago & North Western divided an order for 1000 50-ton box cars evenly between American Car & Foundry Co. and Pullman-Standard Car Mfg. Co.

Kansas City Southern ordered 50 automobile cars from Pullman-Standard and also 2000 50-ton box cars and 75 70-ton hoppers for the Louisiana & Arkansas from the same company.

Minneapolis, St. Paul & Sault Ste. Marie bought 250 and Wisconsin Central 150 50-ton box cars from Pullman-Standard.

Missouri Pacific has been granted authority by Federal Court to purchase 1000 box cars, 50 covered hoppers and 37,600 tons of rails. It has placed an order for 100 auto part cars with American Car & Foundry Co.

The U. S. Government ordered 50 flat and 50 tank cars from American Car & Foundry. The Navy is asking bids on two 50-ton Diesel-electric locomotives.

Baltimore & Ohio bought 27 70-ton gondolas from Bethlehem.

Reading ordered two 1000 and two 600-hp. Diesel-electric engines from Electro-Motive Corp., two 600-hp. units from American Locomotive Co. and is expected to place four units of 400-hp. tractive capacity with Baldwin Locomotive Co.

Niagara Junction Railway has purchased two 50-ton electric locomotives from Iron & Steel Products, Inc.

South African Railways is reported to have placed an order for 1000 gondolas with Canadian Car & Foundry Co.

Lehigh Valley is expected to enter the market for 1010 freight cars; Detroit, Toledo & Ironton is inquiring for 50 hoppers. Southern Pacific for 25 baggage cars, and Erie for five baggage and five flat cars.

New York, New Haven & Hartford is seeking Federal Court authority to buy five 4000-hp. and six 44-ton Diesel-electric locomotives.

Western Pacific will ask the District Court for authority to buy three 5400-hp. Diesel-electric engines.

Alabama, Tennessee & Northern wants authority to buy one 300-hp. Diesel-electric switch.

Ralph Budd, head of the NDAC transportation division, told THE IRON AGE on Tuesday that a plan for standardization of freight cars is not contemplated but that it is safe to say present designs will be frozen and repeat orders placed in order to attain efficient and expeditious production. He said there was general agreement on the plan at the meeting of members of the Association of American Railroads in Chicago on Monday, which he addressed.

Reinforcing Steel

... Defense jobs predominate in awards of 13,685 tons

Reinforcing steel awards call for 13,685 tons and include 2000 tons for shipyards at New Orleans.

New reinforcing steel projects total 10,945 tons.

Structural Steel

... Awards 22,500 tons, new projects 33,600 tons

Fabricated structural steel awards declined to 22,500 tons from 49,925 tons last week. The largest awards include 3500 tons at Herkimer, N. Y., for grade crossing elimination over New York Central Railroad tracks, and 3000 tons at Bayonne, N. J., for dry dock tremie trusses for Bayonne Associates.

New structural steel projects of 33,600 tons doubled a week ago.

Total Requirement of Steel for Rail Transportation for Year 1941

	On Order Net Tons	To Be Ordered Net Tons	Total Net Tons
Rail	705,211	299,950	1,005,161
Plates, shapes, bars, sheets, billets, etc.....	1,126,469	796,793	1,923,262
Steel castings, incl. side frames, bolsters, etc.....	241,579	282,244	523,823
Axles, forgings, incl. rolled steel wheels, etc.....	202,783	295,754	498,537
Miscellaneous steel, incl. bolts, nuts, etc.....	123,670	174,174	297,844
Track fastenings	338,059	170,112	508,171
Frogs, switches, guard rails, etc.....	35,619	30,822	66,441
Steel for bridges, buildings, etc.....	20,914	70,403	91,317
Total.....	2,794,304	2,120,252	4,914,556

Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

Reception of the new scrap price schedule (see insert this issue) announced by the Office of Price Administration and Civilian Supply has been mixed. General opinion is that while it has served to correct some unfavorable features of the original order, it has also given rise to several new questions, particularly those of barge shipments and price relationships between the various cast grades, and has left unsolved the problem of attracting the marginal scrap supplies necessary to support present capacity steel mill operations.

Movement of scrap to consumers has slackened somewhat from the level reached previous to the May 10 deadline, but a moderate amount of new business has been transacted on basis of the new ceilings. The real test of the stabilization effort will come over the next 30 days when all activities will be conducted under the new maximums.

The opportunity to equalize freight up to a \$1 a ton is expected to put all mills on a parity so far as acquiring supplies is concerned, but leading scrap interests hold the view that the only solution to the entire scrap question is still one of establishing regional f.o.b. prices.

Price fixing efforts are expected to result in curtailment of collections from small yards as these operators seek more lucrative fields. However, the sentiment in Washington is strongly in favor of Government action in stepping in and commandeering any yard supplies which are being withheld in hopes of forcing higher prices. Failure to take action on "remote" scrap is also a source of complaint.

The export situation is still much confused. Placement of May requirements of the British is still being held up despite the fact that several boats are now available for shipment of this material. The new price schedules did not alter the export price problem and brokers are now pressing for further clarification of this situation.

Pittsburgh

Although the amount of business transacted under the new scrap setup has not been large, definite commitments have

been made, and the consensus seems to be that the market is more clarified than for some time. It will probably take a week or so for the general order to be thoroughly digested throughout the country and actual transactions are being carried on by those who have already given close study to the new setup. It is understood orders which were taken after April 3 but before May 7, if covered before May 7, will be completed, whereas it is believed those orders not covered by May 7 will be cancelled. The ability of consumers to equalize up to \$1 on scrap coming from origins utilized in the past will settle many of the difficulties presented by the first scrap order.

Chicago

Issuance of the new price schedule has again shoved the situation into the doldrums. Despite mills crying for scrap, everyone is again afraid to make more than absolutely necessary deals pending clarification of the new rules and regulations. Trade is divided in its reception of the new setup, some urging that freight differentials were better under the original rulings and that these be returned. Railroads are not selling as much scrap as expected since they are repairing equipment for use which they ordinarily would dismantle. A cargo of bundles was shipped from here last week to Cleveland.

Philadelphia

Reaction to the new price schedule here is mixed. While some local situations, particularly that of the Bethlehem differential, have been favorably received, other complications have arisen. As a result of the new schedule, barge shipments from New England points and the South, which have accounted for as much as 90 per cent of some consumers' receipts, are expected to cease completely. The disturbance created by price fixing has left several district consumers in a very tight spot. Cleaning up of old orders in the past week acted to spur shipments, but with that incentive gone, considerable apprehension is felt over the volume of scrap shipments in coming weeks.

Youngstown

Whether this district has been benefited by the changed scrap setup is a matter of doubt. Some mill buyers believe they soon may be forced to ask for a directed movement of scrap here. The only sure thing is that scrap supplies here are being depleted fast.

Cleveland

After examining the latest setup on scrap prices the conviction is expressed freely here that rationing will be forced soon. Holders of this viewpoint apparently are looking at the broad, long range picture, because supplies of open hearth material here are more ample currently than at some other midwestern consump-

tion points. The new 50c. commission for dealers has brought considerable disfavor.

Buffalo

A good deal of confusion has resulted from the revised schedule of maximum prices, dealers here complain. Cast scrap prices, they contend, are too low and there will be difficulty in getting it to market as a result. Veteran dealers, objecting to the 50c. difference in price between drop broken cast and machinery cast (cupola size), claim it is impossible, in most cases, to distinguish between these two items, and that the price should be the same. Some brokers predict a scarcity of low phos. punchings and plate scrap on the ground that lower prices allowed for these items will result in their being sold as No. 1 steel.

Birmingham

With only small inventories remaining after completion of old contracts, very little tonnage is being sold by dealers here. The foundry cast grades situation is made increasingly serious by the government's price revision. On scrap generally, movement to yards is very slow.

Cincinnati

With virtually all the May 10 contracts completed, dealers are marking time to watch developments, now that the market is in full swing under the government ceiling price setup. One or two interests reported the loss of a fair number of contracts because of inability to make delivery by May 10, as result of the failure to be able to obtain material, but this situation is not general in the market. Scrap producers are reported holding tightly to available material and dealers generally anticipate that this picture will increase.

St. Louis

With further revisions expected, dealers of scrap iron in St. Louis continue to mark time, and there has been little trading with mills. The cancellation period found nearly all orders filled.

New York

The new price schedule has thrown this district again into confusion. Most old orders were completed under the deadline and, while some new business is being done, material is slow in coming out. The export situation is awaiting clarification.

Boston

New government rulings on prices, basing points and the placing of barge on railroad freight rates has caused fresh confusion among the trade. As a result, not much business has been transacted except in turnings and bundled skeleton.

Detroit

Dealers report that activity in the market here is nominal and that difficulties over foundry scrap still prevail.

Scrap Price Schedule Broadened; Now Covers 34 Consuming Points

As Revised

Consuming Points

TO eliminate inequalities and ambiguities existing in the original schedule of maximum iron and steel scrap prices issued April 3, the office of Price Administration and Civilian Supply on May 7 put into effect a new and revised list of ceiling prices. Chief changes in the schedule are as follows:

1. Maximum prices are set for 34 consuming points as compared with 13 in the first list.

2. A number of additional grades of scrap are covered by the revised schedule, including the following: low phos billet and bloom crops, low phos bar crops and smaller, low phos punchings and plate scrap, No. 2 cupola cast, machinery cast cupola size, clean agricultural cast, No. 1 machinery cast drop broken 150 lb. and under, clean auto cast, punchings and plate scrap, heavy axle and forge turnings, and medium and heavy electric furnace turnings.

3. A formula is set up to provide equal access to scrap supplies by consumers located at one of the 34 recognized consuming points and by consumers located outside such consuming points. This formula provides that a consumer located outside such a consuming point may pay as much as \$1 per gross ton more than a consumer at the nearest consuming point. This may be done if the transportation costs to his plant are no more than \$1 greater than the transportation costs to the consuming point nearest his plant. This increase of \$1 is permitted only if the consumer has been served from the same source in the past.

4. Action has been taken to meet complaints of some consumers that they could not obtain scrap from their own areas because under the original order consumers in other areas were permitted to pay higher prices. This problem has been met by basing all maximum prices on all-rail shipments to consumers with the

exception that where shipment is by other than all-rail the maximum prices are reduced by the amount that all-rail costs of shipment exceed the costs of any other mode of transportation used.

5. Provision has been made to aid consumers not located on the line of a railroad to obtain scrap from that road.

6. Disadvantages resulting from the fact that switching charges may differ at different points on a railroad's line are eliminated. This is done by placing consumers in different switching districts on the same railroad on a parity.

7. Provision is made for sale of railroad scrap, for which the railroad of origin cannot be identified, at prices not in excess of the maxima established for similar grades of non-railroad scrap.

8. The 3 per cent brokerage commission established in the original schedule has been replaced by a commission of 50c. per ton which may be paid to a broker or agent for scrap delivered to a consumer either at the maximum or at a lower price.

9. The new schedule requires railroads to take care of their regular on-the-line customers before shipping their scrap to consumers located off-the-line.

10. Prices have been set for exports from Gulf ports, but method of computing other export prices remains unchanged.

11. Price of unprepared yard scrap is established at not exceeding \$2.50 a ton less than the published maximum.

Leon Henderson, OPACS administrator, said that the changes

reflected suggestions from sellers and consumers and were designed to improve operation of price control measures.

Mr. Henderson expressed the hope that efforts on the part of most of the industry to cooperate with OPACS would continue. He warned, however, that if necessary he was prepared to employ every means at his disposal to obtain compliance with the schedule.

The order specifically forbids splitting of the brokerage fee. "No dealer or broker . . . splits or divides the commission allowed him . . . with the sellers or seller of the scrap or consumer," the order states. As in the past the brokerage fee is to be shown as a separate item on the invoice.

Consumers, brokers and dealers are requested to divert rerolling rails to rerolling mills and not to cut the rails for melting purposes.

All dealers, producers, smelters, processors and brokers and consumers must keep for inspection for not less than one year a detailed record of all sales. They must also keep a record of scrap on hand and on order as of the end of each month.

Consumers are also requested to file information on scrap inventories, amount purchased in the month and relationship of consumption to ingot production.

In event of an evasion or attempt at evasion, the OPACS indicated that it will make every effort to assure that the Congress and public are fully informed of the evasion and that the "powers of the Government are fully exerted . . . to protect the public interest and the interests of those persons who conform to the ceilings." Persons having evidence of evasion, speculation or manipulation, or of hoarding or accumulating unnecessary inventories, are requested to communicate with the OPACS.

GRADES

No. 1 heavy melting steel
No. 1 hydraulic compressed black sheet scrap
No. 2 heavy melting steel
Dealers' No. 1 bundles
Dealers' No. 2 bundles
Mixed borings and turnings
Machine shop turnings
Shoveling turnings
No. 1 busheling
No. 2 busheling
Cast iron borings
Uncut structural and plate scrap
No. 1 cupola
Heavy breakable cast
Stove plate
Low phos. billet and bloom crops
Low phos. bar crops and smaller
Low phos. punchings and plate scrap
No. 2 cupola
Machinery cast cupola size**
No. 1 mach. cast, drop-broken, 150 lb. and under
Clean auto cast
Punchings and plate scrap***
Punchings and plate scrap****
Heavy axle and forge turnings
Medium heavy electric furnace turnings

*This grade is 3/4-in. a
**This grade also may

Consuming Points

GRADES

No. 1 heavy melting
Scrap rails
Rerolling rails
Scrap rails 3 ft. and under
Scrap rails 2 ft. and under
Scrap rails 18 in. and under

a The Birmingham pr
mingham consumption
may pay \$1 more than

Max

Extra copies of this price schedule may be obtained at 25c. each. Address The Iron Age, 100 East 42nd Street, New York

The maximum export including scrap of rail Atlantic Coast shall be as shown (1) under the domestic consuming transportation charges charge of \$1.00 per gr

ened; Now

Points

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All dealers, producers, smelters, processors and brokers and consumers must keep for inspection for not less than one year a detailed record of all sales. They must also keep a record of scrap on hand and on order as of the end of each month.

Consumers are also requested to file information on scrap inventories, amount purchased in the month and relationship of consumption to ingot production.

In event of an evasion or attempt at evasion, the OPACS indicated that it will make every effort to assure that the Congress and public are fully informed of the evasion and that the "powers of the Government are fully exerted . . . to protect the public interest and the interests of those persons who conform to the ceilings." Persons having evidence of evasion, speculation or manipulation, or of hoarding or accumulating unnecessary inventories, are requested to communicate with the OPACS.

APPENDIX A

Maximum Iron and Steel Scrap Prices

As Revised by OPACS May 7, 1941—Dollars per Gross Ton, Delivered Consumers' Plant

Consuming Points	Pittsburgh Sharon, Pa.	Wheeling, W. Va. Steubenville, O. Youngstown Canton, O.	Chicago Kokomo, Ind. Peoria, Ill.	South Bethlehem, Pa.	Claymont, Del. Coatesville, Pa. Phoenixville, Pa. Harrisburg, Pa.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O. Middletown, O. Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala. ^a	Chattanooga, Tenn.	Radford, Va.	Worcester Bridgeport, Conn. Philaedale, Pa.
GRADES																	
No. 1 heavy melting steel	20.00		18.75	18.25	18.75	18.25	19.50	19.25	18.50	17.50	16.00	17.85	18.00	17.00			15.50
No. 1 hydraulic compressed black sheet scrap	20.00		18.75	18.25	18.75	18.25	19.50	19.25	18.50	17.50	16.00	17.85	18.00	17.00			15.00
No. 2 heavy melting steel	19.00		17.75	17.25	17.75	17.25	18.50	18.25	17.50	16.50	15.00	16.85	17.00	16.00			14.50
Dealers' No. 1 bundles	19.00		17.75	17.25	17.75	17.25	18.50	18.25	17.50	16.50	15.00	16.85	17.00	16.00			14.50
Dealers' No. 2 bundles	18.00		16.75	16.25	16.75	16.25	17.50	17.25	16.50	15.50	14.00	15.85	16.00	15.00			13.50
Mixed borings and turnings	15.25		14.00	13.50	14.00	13.50	14.75	14.50	13.75	12.75	11.25	13.10	13.25	12.25			10.75
Machine shop turnings	15.50		14.25	13.75	14.25	13.75	15.00	14.75	14.00	13.00	11.50	13.35	13.50	12.50			11.00
Shoveling turnings	16.50		15.25	14.75	15.25	14.75	16.00	15.75	15.00	14.00	12.50	14.35	14.50	13.50			12.00
No. 1 busheling	19.50		18.25	17.75	18.25	17.75	19.00	18.75	18.00	17.00	15.50	17.35	17.50	16.50			15.00
No. 2 busheling	15.50		14.25	13.75	14.25	13.75	15.00	14.75	14.00	13.00	11.50	13.35	13.50	12.50			11.00
Cast iron borings	15.75		14.50	14.00	14.50	14.00	15.25	15.00	14.25	13.25	11.75	13.50	13.75	12.75			11.25
Uncut structural and plate scrap	19.00		17.75	17.25	17.75	17.25	18.50	18.25	17.50	16.50	15.00	16.85	17.00	16.00			14.50
No. 1 cupola	21.00		20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00	15.00	19.00	21.00	17.75	20.00	21.00	22.00
Heavy breakable cast	19.50		18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50	13.50	17.50	19.50	16.25			20.50
Stove plate	19.00		16.00	18.00	18.50	18.00	15.75	19.00	13.00	14.50	12.50	12.75		12.00			14.00
Low phos. billet and bloom crops	25.00		23.75	23.25	23.75	23.25	24.50	24.25	23.50	22.50	21.00	22.85	23.00	22.00			20.50
Low phos. bar crops and smaller	23.00		21.75	21.25	21.75	21.25	22.50	22.25	21.50	20.50	19.00	20.85	21.00	20.00			18.50
Low phos. punchings and plate scrap*	23.00		21.75	21.25	21.75	21.25	22.50	22.25	21.50	20.50	19.00	20.85	21.00	20.00			18.50
No. 2 cupola	20.00		19.00	21.50	22.00	21.50	21.00	19.00	20.00	19.00	14.00	18.00	20.00	16.75	19.00	20.00	21.00
Machinery cast cupola size*	22.00		21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00	16.00	20.00	22.00	18.75	21.00	22.00	23.00
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50		21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	16.50	20.50	22.50	19.25	21.50	22.50	23.50
Clean auto cast	22.50		21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	16.50	20.50	22.50	19.75	21.50	22.50	23.50
Punchings and plate scrap***	22.00		20.75	20.25	20.75	20.25	21.50	21.25	20.50	19.50	18.00	19.85	20.00	19.00			17.50
Punchings and plate scrap****	21.00		19.75	19.25	19.75	19.25	20.50	20.25	19.50	18.50	17.00	18.85	19.00	18.00			16.50
Heavy axle and forge turnings	19.50		18.25	17.75	18.25	17.75	19.00	18.75	18.00	17.00	15.50	17.35	17.50	16.50			15.00
Medium heavy electric furnace turnings	18.00		16.75	16.25	16.75	16.25	17.50	17.25	16.50	15.50	14.00	15.85	16.00	15.00			13.50

*This grade is $\frac{3}{8}$ -in. and heavier, cut 12 in. and under.

**This grade also may include clean agricultural cast.

This grade is under $\frac{3}{8}$ -in. to $\frac{1}{4}$ -in., cut 12 in. and under.*This grade is under $\frac{1}{4}$ -in. to No. 12 gage, cut 12 in. and under.

APPENDIX B

Maximum Prices for Railroad Scrap

Delivered Consumers' Plants Located on Line of Railroad Originating Scrap

Consuming Points	Pittsburgh Sharon, Pa.	Wheeling, W. Va. Steubenville, O. Youngstown Canton, O.	Chicago Kokomo, Ind. Peoria, Ill.	Philadelphia	Wilmington, Del.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O. Middletown, O. Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala. ^a	Chattanooga, Tenn.	Radford, Va.	Worcester Bridgeport, Conn. Philaedale, Pa.
GRADES																	
No. 1 heavy melting	21.00		19.75	19.75	19.75	19.75	20.50	20.25	19.50	18.50	17.00	18.85	19.00	18.00			16.50
Scrap rails	22.00		20.75	20.75	20.75	20.75	21.50	21.25	20.50	19.50	18.00	19.85	20.00	19.00			17.50
Rerolling rails	23.50		22.25	22.25	22.25	22.25	23.00	22.75	22.00	21.00	19.50	21.35	21.50	20.50			19.00
Scrap rails 3 ft. and under	24.00		22.75	22.75	22.75	22.75	23.50	23.25	22.50	21.50	20.00	21.85	22.00	21.00			19.50
Scrap rails 2 ft. and under	24.25		23.00	23.00	23.00	23.00	23.75	23.50	22.75	21.75	20.25	22.10	22.25	21.25			19.75
Scrap rails 18 in. and under	24.75		23.50	23.50	23.50	23.50	24.25	24.00	23.25	22.25	20.50	22.60	22.75	21.75			20.25

^a The Birmingham prices set forth are for scrap delivered to the Birmingham, Ala., consuming point, excepting scrap for Birmingham consumption originating west of the western boundary of Alabama. In the latter case the Birmingham, Ala., consumer may pay \$1 more than the prices indicated under Birmingham.

Maximum Prices for Iron and Steel Scrap for Export from the United States

Per Gross Ton, F.A.S. Point of Export

The maximum export prices applicable to iron and steel scrap, including scrap of railroad origin, f.a.s. at all ports located on the Atlantic Coast shall be the maximum prices for the grades of scrap as shown (1) under Appendix A and (2) under Appendix B for the domestic consuming point nearest the place of export, less the transportation charges to the f.a.s. point of export, plus a uniform charge of \$1.00 per gross ton.

At all United States ports located on the Gulf of Mexico maximum price for No. 1 Heavy Melting Steel shall be \$15.00 gross ton f.a.s., point of export plus \$1.00 per gross ton. For other quality classifications the differentials for grade as outlined in Appendix A and as set forth and determined under Appendix B shall be applied to \$15.00 as a base and \$1.00 added to obtain maximum prices.

APPENDIX A

Maximum Iron and Steel Scrap Prices

As Revised by OPACS May 7, 1941—Dollars per Gross Ton, Delivered Consumers' Plant

Consuming Points	Pittsburgh, Pa.	Sharon, Pa.	Wheeling, W. Va.	Steubenville, O.	Youngstown, O.	Chicago, Ill.	Kokomo, Ind.	Peoria, Ill.	South Bethlehem, Pa.	Claymont, Del.	Coatesville, Pa.	Phoenixville, Pa.	Harrisburg, Pa.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O.	Middletown, O.	Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala.	Chattanooga, Tenn.	Radford, Va.	Worcester, Mass.	Bridgeport, Conn.	Philipsdale, R. I.	Los Angeles	San Francisco	Portland, Ore.	Seattle
GRADES																																	
No. 1 heavy melting steel	20.00					18.75			18.25	18.75				18.25	19.50	19.25	18.50	17.50	16.00	17.85	18.00	17.00					15.50				14.50		
No. 1 hydraulic compressed black sheet scrap	20.00					18.75			18.25	18.75				18.25	19.50	19.25	18.50	17.50	16.00	17.85	18.00	17.00					15.00				14.50		
No. 2 heavy melting steel	19.00					17.75			17.25	17.75				17.25	18.50	18.25	17.50	16.50	15.00	16.85	17.00	16.00					14.50				13.50		
Dealers' No. 1 bundles	19.00					17.75			17.25	17.75				17.25	18.50	18.25	17.50	16.50	15.00	16.85	17.00	16.00					14.50				13.50		
Dealers' No. 2 bundles	18.00					16.75			16.25	16.75				16.25	17.50	17.25	16.50	15.50	14.00	15.85	16.00	15.00					13.50				12.50		
Mixed borings and turnings	15.25					14.00			13.50	14.00				13.50	14.75	14.50	13.75	12.75	11.25	13.10	13.25	12.25					10.75				9.75		
Machine shop turnings	15.50					14.25			13.75	14.25				13.75	15.00	14.75	14.00	13.00	11.50	13.35	13.50	12.50					11.00				10.00		
Shoveling turnings	16.50					15.25			14.75	15.25				14.75	16.00	15.75	15.00	14.00	12.50	14.35	14.50	13.50					12.00				11.00		
No. 1 busheling	19.50					18.25			17.75	18.25				17.75	19.00	18.75	18.00	17.00	15.50	17.35	17.50	16.50					15.00				14.00		
No. 2 busheling	15.50					14.25			13.75	14.25				13.75	15.00	14.75	14.00	13.00	11.50	13.35	13.50	12.50					11.00				10.00		
Cast iron borings	15.75					14.50			14.00	14.50				14.00	15.25	15.00	14.25	13.25	11.75	13.50	13.75	12.75					11.25				10.25		
Uncut structural and plate scrap	19.00					17.75			17.25	17.75				17.25	18.50	18.25	17.50	16.50	15.00	16.85	17.00	16.00					14.50				13.50		
No. 1 cupola	21.00					20.00			22.50	23.00				22.00	22.00	20.00	21.00	20.00	15.00	19.00	21.00	17.75				20.00	21.00			22.00		18.00	
Heavy breakable cast	19.50					18.50			21.00	21.50				21.00	20.50	18.50	19.50	18.50	13.50	17.50	19.50	16.25					20.50				17.00		
Stove plate	19.00					16.00			18.00	18.50				18.00	15.75	19.00	13.00	14.50	12.50	12.75	12.00					14.00				14.00			
Low phos. billet and bloom crops	25.00					23.75			23.25	23.75				23.25	24.50	24.25	23.50	22.50	21.00	22.85	23.00	22.00					20.50				18.50		
Low phos. bar crops and smaller	23.00					21.75			21.25	21.75				21.25	22.50	22.25	21.50	20.50	19.00	20.85	21.00	20.00					18.50				17.00		
Low phos. punchings and plate scrap*	23.00					21.75			21.25	21.75				21.25	22.50	22.25	21.50	20.50	19.00	20.85	21.00	20.00					18.50				17.00		
No. 2 cupola	20.00					19.00			21.50	22.00				21.50	21.00	19.00	20.00	19.00	14.00	18.00	20.00	16.75				19.00	20.00			21.00		17.00	
Machinery cast cupola size**	22.00					21.00			23.50	24.00				23.50	23.00	21.00	22.00	21.00	16.00	20.00	22.00	18.75				21.00	22.00			23.00		19.00	
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50					21.50			24.00	24.50				24.00	23.50	21.50	22.50	21.50	16.50	20.50	22.50	19.25				21.50	22.50			23.50		19.50	
Clean auto cast	22.50					21.50			24.00	24.50				24.00	23.50	21.50	22.50	21.50	16.50	20.50	22.50	19.75				21.50	22.50			23.50		19.50	
Punchings and plate scrap***	22.00					20.75			20.25	20.75				20.25	21.50	21.25	20.50	19.50	18.00	19.85	20.00	19.00					17.50				16.00		
Punchings and plate scrap****	21.00					19.75			19.25	19.75				19.25	20.50	20.25	19.50	18.50	17.00	18.85	19.00	18.00					16.50				15.00		
Heavy axle and forge turnings	19.50					18.25			17.75	18.25				17.75	19.00	18.75	18.00	17.00	15.50	17.35	17.50	16.50					15.00				14.00		
Medium heavy electric furnace turnings	18.00					16.75			16.25	16.75				16.25	17.50	17.25	16.50	15.50	14.00	15.85	16.00	15.00					13.50				12.50		

*This grade is $\frac{3}{8}$ -in. and heavier, cut 12 in. and under.
 **This grade also may include clean agricultural cast.

***This grade is under $\frac{3}{8}$ -in. to $\frac{1}{4}$ -in., cut 12 in. and under.
 ****This grade is under $\frac{1}{4}$ -in. to No. 12 gage, cut 12 in. and under.

APPENDIX B

Maximum Prices for Railroad Scrap

Delivered Consumers' Plants Located on Line of Railroad Originating Scrap

Consuming Points ➤		Pittsburgh Sharon, Pa. Wheeling, W. Va. Steubenville, O. Youngstown Canton, O.	Chicago Kokomo, Ind. Peoria, Ill.	Philadelphia	Wilmington, Del.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O. Middletown, O. Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala. ²⁰	Chattanooga, Tenn.	Radford, Va.	Worcester Bridgeport, Conn. Phillipsdale, R. I.	Los Angeles San Francisco Portland, Ore. Seattle
▼ GRADES																		
No. 1 heavy melting.....	21.00	19.75	19.75	19.75	19.75	20.50	20.25	19.50	18.50	17.00	18.85	19.00	18.00				16.50	15.50
Scrap rails.....	22.00	20.75	20.75	20.75	20.75	21.50	21.25	20.50	19.50	18.00	19.85	20.00	19.00				17.50	16.50
Rerolling rails.....	23.50	22.25	22.25	22.25	22.25	23.00	22.75	22.00	21.00	19.50	21.35	21.50	20.50				19.00	18.00
Scrap rails 3 ft. and under.....	24.00	22.75	22.75	22.75	22.75	23.50	23.25	22.50	21.50	20.00	21.85	22.00	21.00				19.50	18.50
Scrap rails 2 ft. and under.....	24.25	23.00	23.00	23.00	23.00	23.75	23.50	22.75	21.75	20.25	22.10	22.25	21.25				19.75	18.75
Scrap rails 18 in. and under.....	24.75	23.50	23.50	23.50	23.50	24.25	24.00	23.25	22.25	20.50	22.60	22.75	21.75				20.25	19.25

a The Birmingham prices set forth are for scrap delivered to the Birmingham, Ala., consuming point, excepting scrap for Birmingham consumption originating west of the western boundary of Alabama. In the latter case the Birmingham, Ala., consumer may pay \$1 more than the prices indicated under Birmingham.

Maximum Prices for Iron and Steel Scrap for Export from the United States

Per Gross Ton, F.A.S. Point of Export

The maximum export prices applicable to iron and steel scrap, including scrap of railroad origin, f.a.s. at all ports located on the Atlantic Coast shall be the maximum prices for the grades of scrap as shown (1) under Appendix A and (2) under Appendix B for the domestic consuming point nearest the place of export, less the transportation charges to the f.a.s. point of export, plus a uniform charge of \$1.00 per gross ton.

At all United States ports located on the Gulf of Mexico, the maximum price for No. 1 Heavy Melting Steel shall be \$15.00 per gross ton f.a.s., point of export plus \$1.00 per gross ton. For all other quality classifications the differentials for grade as outlined in Appendix A and as set forth and determined under Appendix B shall be applied to \$15.00 as a base and \$1.00 added to obtain the maximum prices.

Explanations of Scrap Prices in Appendix A

A consuming point includes the switching district of the cities named.

The grades listed in Appendix A are, except Dealers' No. 1 and No. 2 bundles and uncut structural and plate scrap, as named and defined in the simplified practice recommendations R-580-36 of the Department of Commerce which shall be the governing specifications for iron and steel scrap hereunder.

The grades listed in Appendix A represent the major classifications of iron and steel scrap. The maximum prices of superior or inferior grades shall continue to bear the same comparable relationship to those major grade classifications as heretofore existed between the prices of such superior or inferior grades and the prices of the major grades.

For Scrap Delivered to A Consumer Not Located in A Listed Consuming Point

The maximum price is to be computed in the following manner:

The maximum price of scrap at the point from which such scrap is to be shipped is the maximum price specified for such scrap delivered to any consumer in the consuming point nearest, in terms of transportation costs, to the point from which the scrap is to

be shipped less the lowest cost of transporting the scrap from the point of shipment to the consumer located at the consuming point nearest the scrap.

A consumer, if he can establish that he has been served by the same source of scrap in the past, may pay, to the extent necessary to absorb the transportation costs from the shipping point to his plant, a price delivered to his plant which exceeds by not more than \$1 per gross ton the maximum price set forth for the scrap delivered to the consuming point nearest, in terms of transportation costs, to the consumer's plant. In no case shall the consumer pay a sum in excess of the price established under the preceding paragraph plus the lowest cost of transporting scrap to his plant from the point of shipment.

Billet and Bloom Crops Originating in Pittsburgh

Where the grade of scrap classified as billet and bloom crops originates in the Pittsburgh consuming point, it may be sold delivered to a consumer, located within or without the Pittsburgh consuming point, at the price es-

tablished in Paragraph I hereof for Pittsburgh plus not more than \$2.50 in transportation costs from the point of origin to the consumer's plant. In no case shall the consumer pay a sum in excess of the price established hereof for the Pittsburgh consuming point consumer plus the lowest cost of transporting the scrap from the point of origin to the consumer's plant.

Unprepared Scrap

All unprepared yard scrap shall be sold at prices not exceeding \$2.50 less than the maximum prices established above.

Shipment by Means Other Than All-Rail

The maximum prices established herein have been based upon all-rail deliveries to the above-named consuming points, excepting Detroit. Where shipment to the consumer is by means other than all-rail, the maximum prices established herein, excepting those established for the Detroit consuming point, shall be reduced by the amount that the all-rail transportation costs to such consuming point exceed the costs of the mode of transportation used.

Explanations of Scrap Prices in Appendix B

Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such consuming points shall be the maximum price at which any grade of scrap listed in Appendix B may be delivered to a consumer's plant at any point on the railroad's line, except:

Where a railroad from which scrap originates operates in two or more consuming points having different switching charges, the price of such railroad scrap:

(1) To a consumer located within a consuming point having the highest switching charge, shall not exceed the maximum on-the-line price established above. (The switching charge adjustments are also applicable to the maximum prices for grades of scrap not listed as provided in paragraph [a] below.)

(2) To a consumer located within a consuming point not having the highest switching charge, shall not exceed the maximum on-the-line price established above less the difference between the switching charges at that consuming point and at the consuming point having the highest switching charges;

(3) To a consumer located on the line of the railroad at a point having no switching charges, shall not exceed the maximum on-the-line price established above less the highest switching charge at any consuming point on the line; and

(4) To a consumer located off the line of the railroad, shall not exceed the maximum off-the-line price established below less the highest switching charge at any consuming point on the line.

GRADES NOT LISTED

(a) The price at which a consumer located on the line of the railroad from which the scrap originated may purchase any grade of scrap not listed above shall not exceed the average price per gross ton at which such railroad sold such grade delivered to the plant of a consumer, whether located on or off the line of the railroad, during the period commencing Sept. 1, 1940, and ending Jan. 31, 1941, or, in case no sale was made during the period, the price at which the grade was last sold by the railroad prior thereto, and, in either event, adjusted to allow for the average grade differentials of the railroad in a

manner indicated in subparagraph (b) below.

(b) For purposes of subparagraph (a) above, the maximum price for any grade not listed in the price table above shall be adjusted to allow for the average grade differentials of the railroad by:

First, computing the amount of the base grade differential for the railroad which shall be the difference between the average price per gross ton at which the railroad from which the scrap originated sold No. 1 railroad grade heavy melting steel scrap delivered to the plant of the consumer, whether located on or off the line of the railroad, during the period commencing Sept. 1, 1940, and ending Jan. 31, 1941, and the railroad's maximum price established for such grade under Appendix B;

Second, by applying this base grade differential to the price to be adjusted by either of the following two methods: Subtracting the amount of such differential from such prices in case the railroad's average price of No. 1 railroad grade heavy melting steel scrap exceeds the railroad's maximum price established for such grade or adding the same in case the railroad's average price is less than such maximum.

Delivered to a Consumer's Plant Located Off the Line of the Railroad From Which the Scrap Originated

The maximum price is either of the following, whichever is greater:

(1) The maximum price established for scrap delivered to a consumer on the line of the railroad from which the scrap originated, or, if the consumer can establish that he has been served by the same source of scrap in the past, this maximum price plus transportation charges, from the railroad's line to the consumer's plant, of not more than \$2 per gross ton for rerolling rails and \$1 per gross ton for all other grades of scrap; or

(2) The prices set forth for the consuming point nearest the consumer's plant.

Scrap Originating From Railroads Not Operating in Any of the Consuming Points Named

The maximum price of any grade of such scrap delivered to a consumer shall not exceed the average price per gross ton at which the

railroad from which the scrap originated sold such grade delivered to a consumer's plant during the period commencing Sept. 1, 1940, and ending Jan. 31, 1941, or in the case of no sale being made during the period, the price at which the grade was last sold by the railroad prior thereto.

Scrap Which Cannot Be Identified As to Origin

The maximum price per gross ton at which a consumer may purchase delivered at his plant, any grade of railroad scrap which cannot be identified as to origin, shall not exceed the maximum price established under Appendix A of this schedule for the grade in which such scrap may be classified.

Unprepared Scrap

(1) Identifiable as to grade. Unprepared scrap which may be identified as to grade may not be sold at prices exceeding \$2.50 less than the maximum prices established herein.

(2) Unidentifiable as to grade. Unprepared scrap which cannot be identified as to grade (for example, a box car, a locomotive, or the like) is not subject to the maximum prices established herein until such scrap has been prepared for consumption.

Scrap Prepared by a Person Other Than a Railroad

Where scrap originates from a railroad but is broken down and prepared by a person other than a railroad and the railroad origin of such scrap is known, the maximum price at which a consumer may purchase such scrap shall be the price established above for purchases of scrap prepared by the railroad.

Shipment by Means Other Than All-Rail

The maximum prices established herein have been based upon all-rail deliveries to the above-named consuming points, excepting Detroit. Where shipment to the consumer is by means other than all-rail, the maximum prices established herein, excepting those established for the Detroit consuming point, shall be reduced by the amount that the all-rail transportation costs to such consuming point exceed the costs of the mode of transportation used.

Sheet Production in March at 107% of Capacity

Although plates are generally considered to be in greatest demand among all carbon steel products, in relation to capacity, it is an interesting and significant fact that plate production in March was only 87 per cent of capacity, while output of all grades of sheets was at 107.3 per cent of capacity.

These figures are revealed in the American Iron and Steel Institute's

monthly report on "production for sale" of iron and steel products. No other rolled products exceeded 100 per cent of capacity output. Structural shapes were produced at a rate of 85.1 per cent, bars at 88.9 per cent and drawn wire at 95.3 per cent.

The full record for first quarter shows a similar comparison. During that period sheet production

averaged 105.5 per cent of capacity, far above the rate attained in any other product.

March production of all steel produced for sale was 5,411,319 net tons, of which 365,737 tons was sold to members of the industry for further conversion. The total production during first quarter was 15,422,703 tons.

AIS
Form 10

35-200-4-41

AMERICAN IRON AND STEEL INSTITUTE										March - 1941		
Capacity and Production for Sale of Iron and Steel Products										PERIOD		
	Number of companies	Items	* Annual Capacity Net tons	PRODUCTION FOR SALE—NET TONS								
				Current Month				Year to Date				
				Total	Per cent of capacity	Shipments		Total	Per Cent of capacity	Shipments		
					Export	To members of the industry for conversion into further finished products			Export	To members of the industry for conversion into further finished products		
Ingots, blooms, billets, slabs, sheet bars, etc.	32	1	xxxxxxx	529,341	xxx	144,775	159,443	1,650,770	xxx	578,816	405,216	
Heavy structural shapes	8	2	5,175,800	374,135	85.1	12,849	xxxxxxx	1,065,266	83.4	57,815	xxxxxxx	
Steel piling	4	3	360,000	22,663	74.1	3,424	xxxxxxx	62,841	70.8	6,269	xxxxxxx	
Plates—Sheared and Universal	19	4	6,178,270	456,612	87.0	43,720	2,210	1,299,360	85.3	128,320	6,685	
Skelp	8	5	xxxxxxx	96,189	xxx	16,257	37,518	248,705	xxx	34,503	109,110	
Rails—Standard (over 60 lbs.)	4	6	3,613,600	157,796	51.4	9,710	xxxxxxx	431,126	48.4	27,204	xxxxxxx	
Light (60 lbs. and under)	6	7	302,800	17,643	68.6	7,191	xxxxxxx	50,586	67.7	20,264	xxxxxxx	
All other (Incl. girder, guard, etc.)	2	8	102,000	2,012	23.2	115	xxxxxxx	5,691	22.6	1,040	xxxxxxx	
Splice bar and tie plates	15	9	1,300,200	69,817	63.2	2,089	xxxxxxx	181,193	56.5	5,711	xxxxxxx	
Bars—Merchant	35	10	xxxxxxx	543,707	xxx	61,480	80,980	1,618,437	xxx	192,466	185,095	
Concrete reinforcing—New billet	15	11	xxxxxxx	124,043	xxx	20,375	xxxxxxx	336,395	xxx	58,954	xxxxxxx	
Retrolling	17	12	xxxxxxx	10,572	xxx	1,257	xxxxxxx	29,026	xxx	2,613	xxxxxxx	
Cold finished—Carbon	19	13	xxxxxxx	109,513	xxx	1,785	xxxxxxx	294,089	xxx	5,700	xxxxxxx	
Alloy—Hot rolled	15	14	xxxxxxx	145,160	xxx	11,456	14,303	394,685	xxx	39,605	38,725	
Cold finished	15	15	xxxxxxx	15,410	xxx	1,844	xxxxxxx	41,296	xxx	5,256	xxxxxxx	
Hoops and baling bands	5	16	xxxxxxx	9,725	xxx	472	xxxxxxx	23,850	xxx	820	xxxxxxx	
TOTAL BARS	52	17	12,678,585	957,930	88.9	98,669	95,283	2,737,778	87.6	305,414	223,818	
Tool steel bars (rolled and forged)	15	18	127,870	8,777	80.8	443	xxxxxxx	25,432	80.6	2,174	xxxxxxx	
Pipe and tube—B. W.	13	19	2,029,200	122,568	71.1	10,105	xxxxxxx	371,559	74.2	25,427	xxxxxxx	
L. W.	9	20	1,080,260	39,350	42.9	3,826	xxxxxxx	114,892	43.1	6,379	xxxxxxx	
Electric weld	5	21	692,520	38,045	64.7	440	xxxxxxx	92,487	54.1	1,463	xxxxxxx	
Seamless	15	22	3,143,190	184,022	68.9	16,497	xxxxxxx	504,502	65.1	48,243	xxxxxxx	
Conduit	6	23	152,145	11,323	87.6	215	xxxxxxx	32,621	86.9	404	xxxxxxx	
Mechanical Tubing	12	24	514,975	40,792	93.2	3,291	xxxxxxx	112,418	88.5	12,799	xxxxxxx	
Wire rods	18	25	xxxxxxx	131,971	xxx	17,751	21,120	381,874	xxx	47,325	63,646	
Wire—Drawn	36	26	2,299,340	186,165	95.3	13,547	1,815	526,359	92.8	38,464	5,671	
Nails and staples	19	27	1,137,090	72,806	75.4	6,370	xxxxxxx	208,715	74.4	15,736	xxxxxxx	
Barbed and twisted	16	28	448,770	24,701	64.8	5,014	xxxxxxx	70,553	63.7	15,159	xxxxxxx	
Woven wire fence	15	29	786,790	30,411	45.5	302	xxxxxxx	82,746	42.6	688	xxxxxxx	
Bale ties	11	30	124,450	6,947	65.7	4	xxxxxxx	15,676	51.1	40	xxxxxxx	
All other wire products	5	31	27,030	544	23.7	-	xxxxxxx	1,438	21.6	-	xxxxxxx	
Fence posts	14	32	147,645	5,522	44.0	61	xxxxxxx	17,479	48.0	276	xxxxxxx	
Black plate	11	33	542,935	34,027	73.8	1,147	-	89,291	66.7	3,017	8	
Tin plate—Hot rolled	7	34	842,200	21,072	29.4	1,282	xxxxxxx	60,749	29.2	2,644	xxxxxxx	
Cold reduced	10	35	3,038,860	231,152	89.5	18,378	xxxxxxx	605,672	80.8	50,563	xxxxxxx	
Sheets—Hot rolled	23	36	xxxxxxx	669,915	xxx	26,496	22,887	1,913,409	xxx	87,158	57,264	
Galvanized	14	37	xxxxxxx	159,652	xxx	10,547	xxxxxxx	48,955	xxx	33,733	xxxxxxx	
Cold rolled	15	38	xxxxxxx	299,744	xxx	5,930	xxxxxxx	847,199	xxx	17,986	xxxxxxx	
All other	13	39	xxxxxxx	70,158	xxx	1,733	xxxxxxx	203,825	xxx	5,690	xxxxxxx	
TOTAL SHEETS	26	40	13,151,570	1,199,469	107.3	44,706	22,887	3,423,388	105.5	144,567	57,264	
Strip—Hot rolled	23	41	3,522,380	180,300	60.2	7,212	25,461	512,708	59.0	22,584	67,634	
Cold rolled	34	42	1,385,560	102,251	86.9	1,584	xxxxxxx	288,035	84.3	4,396	xxxxxxx	
Wheels (car, rolled steel)	5	43	422,825	22,288	62.0	6	xxxxxxx	62,626	60.1	151	xxxxxxx	
Axles	4	44	472,280	15,134	37.7	144	xxxxxxx	42,469	36.5	154	xxxxxxx	
Track spikes	11	45	327,275	16,104	57.9	395	xxxxxxx	42,260	52.4	875	xxxxxxx	
All other	4	46	9,100	1,440	186.3	-	xxxxxxx	3,438	153.2	301	xxxxxxx	
TOTAL STEEL PRODUCTS	131	47	xxxxxxx	5,411,319	xxx	491,519	365,737	15,422,703	xxx	1,609,185	939,052	

Pig iron, ferro manganese and spiegel	24	48	xxxxxxx	681,126	xxx	44,119	200,762	1,969,506	xxx	134,742	591,842
Ingot moulds	4	49	xxxxxxx	66,403	xxx	297	xxxxxxx	182,498	xxx	382	xxxxxxx
Bars	9	50	109,195	5,603	60.4	1	117	14,704	54.6	2	705
Pipe and tubes	3	51	109,300	5,191	55.9	52	xxxxxxx	15,197	56.4	122	xxxxxxx
All other	2	52	71,000	1,537	25.5	160	-	5,011	28.6	767	-
TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	224,995	12,331	64.5	213	117	34,912	62.9	891	705

* To be revised

Total number of companies included - 148

The estimated average yield of products for sale from ingots produced by the companies included above is 71.2%, which applied to their total ingot capacity equals 51,533,200 net tons of finished rolled products.

Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:

Current month 5,045,582 N. T. 103.2 %
Year to date 14,483,651 N. T. 102.1 %

Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Deliveries Show Big Gain

New York

• • • While order volume has not slackened, deliveries coming into this territory are on the increase, and for one dealer at least deliveries exceeded order volume in April, halting the climb in backlogs for the first time in many months. The priority situation appears to be in a confused state and the latest ruling seems to be "first come, first served." As a result, deliveries quoted even on A-1-a priorities are well into next year. Interestingly enough, a technical high school has been able to get a low priority rating in connection with defense training and is ordering new tools. A month back, such schools were told to buy used equipment only. Instrument makers are sharing the lime-

light right now, but it is expected that before long the aircraft industry will open up with another big program. Small caliber cannon production is looked for and special types of gun making machinery are being built in anticipation of this business.

All Sales for Defense

Cleveland

• • • The forthcoming large increase in defense program requirements from the machine tool industry, as outlined at the builders' spring convention here, indicates that all the industry's activity will be on defense work for a long time to come, with everything else becoming secondary. No holes can be left in order boards and there can be no diversion of delivery without au-

thorization; and non-defense orders are not to be accepted by producers without permission, among other regulations.

In addition to attempting to step up its own operations, the industry is beginning to cooperate by helping to break in untrained operators in some of the new plants which will turn out products for the defense program.

Warner & Swasey Co. granted a 5 cent per hour wage increase to approximately 2700 production workers May 9.

No Plants on 7-Day Week

Cincinnati

• • • Machinery manufacturers in this area are, to the best of their ability, performing in accordance with recent announced desires of the government. Production has been steadily increased and every conceivable bit of space in local plants is being utilized in a steady effort to make production even larger. Plants, however, except for some special departments or those in which bottlenecks may develop, are not being run more than six days a week.

Cutter Shortage Envisioned

Chicago

• • • Machine tool builders' reaction to the President's request for a seven-day work week was this: "We'll do it if we can get the men; you can't work our present staffs into the ground." Most companies in this area can show that they have increased production 100 per cent or better in the past year. But the problem of getting more men to extend working hours, particularly in the smaller centers, is still serious.

Current the major threat hanging over the industry is the supply of cutting tools. All high-speed tools today require tungsten, which is restricted. Added to this, the accelerated rate of production is using up tools faster, so machine tool users are now asking for three and four sets of tools with each machine instead of one or two sets.

NOW—the New and Still Better! UNICHROME* "AIR DRY" Rack Coating

A rack insulation that is phenomenally resistant to boiling cleaners and all plating solutions, and is

AIR DRYING!

All You Do is Dip Rack and Let it Dry!

Here is a new Unichrome* rack insulating coating that is miles ahead of any rack insulating you ever tried or heard of.

It is even better than the famous Unichrome* Rack Coating-W!

—Because this new Unichrome "Air Dry" Rack Coating has every one of Rack Coating-W's remarkable combination of advantages.

—And adheres in severe plating cycles still better than does Rack Coating-W.

—And cuts more easily at the contacts. But has the immensely important added advantage of being AIR DRYING.

No hot dipping or force drying. All you do is simply dip your racks at room temperature and let them dry in the air after each coat.

Here's the story—seven big money-saving, trouble-saving, time-saving advantages:

- | | |
|--------------------|--|
| (1) Insoluble | —withstands hot cleaners and all plating solutions. |
| (2) Harmless | —contains no ingredients harmful to plating solutions. |
| (3) Tough | —withstands wear and tear of handling. |
| (4) Flexible | —withstands repeated flexing and bending. |
| (5) Durable | —reduces need for re-coating. |
| (6) Easily Applied | —Simply dip and let dry. |
| (7) Convenient | —any part can be patched without re-coating rack. |

Write for Bulletin 15
Containing Complete Information

Platers without rack-coating facilities may have their racks coated with "Unichrome"* "Air Dry" by Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Ill.; Belke Manufacturing Company, 947 North Cicero Avenue, Chicago, Ill.; or United Chromium, Incorporated, Waterbury, Conn.

UNITED CHROMIUM
INCORPORATED

51 East 42nd Street, New York, N. Y.
2751 East Jefferson Ave., Detroit, Mich.
Waterbury, Conn.

*Trade Mark
Reg. U.S. Pat. Off.



Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, May 13—The growing dependence of this country upon Latin American sources of strategic metals was highlighted in the past week with announcement that the Metals Reserve Co. had completed purchase agreements for the entire output of South American copper mines over the balance of the year. Commitments of the MRC now total 500,490 tons, of which 106,722 tons has already been shipped. Allocations of this metal amounted to 31,000 tons in March, 35,000 tons in April and an estimated 40,000 tons in May.

If sufficient cargo space is made available, it is expected that shipments from Chile may eventually reach close to 50,000 tons a month. Imports at this rate, plus domestic output of about 85,000 tons monthly, would just about equal the present rate of consumption. However, in view of the fact that defense demands have not yet reached their peak, further curtailment of civilian use of the red metal is expected, despite the large shipments from Latin America. The domestic copper market continues a routine matter, with mine interests allocating at 12c. a lb. Valley, and smelters at 12½c. Export market remains quiet at 11c. a lb., f.a.s.

Zinc

Efforts to enlarge smelting capacity were evident in the April statistics which showed that refined smelter production reached a new peak of 2110 tons a day, as compared with 2044 tons daily in March. Due to the shorter work period in April, however, total output for the month dropped to 63,305 tons from 63,390 tons in the preceding month. For the first time in more than a year, shipments in April were below production, resulting in a small increase in producers' stocks. April shipments were 63,066 tons, against 63,483 tons in March, while stocks at the end of April stood at 7311 tons as compared with 7072 tons at the close of the previous month. Despite the rise in production, defense requirements continue to outstrip available supplies, indicating that still more drastic curbs on non-war use are in prospect. Zinc market

conditions, while still reflecting the record breaking pace of shipments and production, showed no new developments pricewise in the past week, with prime Western metal unchanged at 7.25c. a lb. E. St. Louis, and 7.65c., New York.

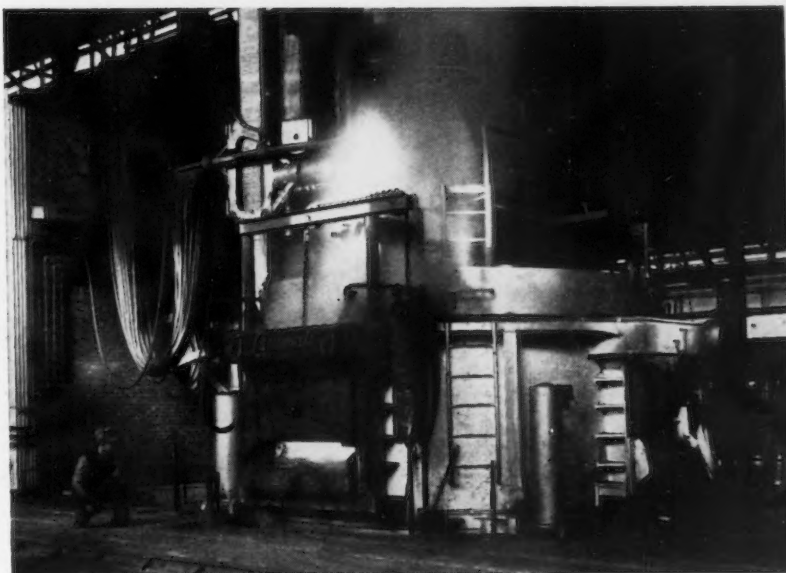
Lead

Demand for lead in the past week was fully equal to the record levels of the preceding three weeks, with no let up yet in sight. May requirements are estimated to be completely covered, with some 45 to 50 per cent of June needs already booked. Despite reports from Washington that considerable stocking of lead is being done by consumers, prevailing market opinion is that the current heavy demand represents entirely consumption requirements. Prices held unchanged throughout the past week at 5.70c. a lb., St. Louis, 5.85c., New York.

Tin

Another period of sustained heavy demand for tin was reported in the past week, at prices ranging between 52.21c., New York, and 52.25c. Consumer interest was evidenced in all positions, but tightness of spot supplies precluded much activity in that position. According to a report issued by the Metals Reserve Co., 30,375 tons of tin has been received by the agency for its stock pile. It was also reported that the agency plans to purchase 150,000 tons of tin, although only 56,986 tons has actually been contracted for. Tin plate makers are slowly working out problems involved in reducing tin coating and while some experimental samples have been distributed to consumers, mills are not yet into full production on the new material.

ANOTHER 75 TON LECTROMELT ON ALLOY STEEL



LECTROMELT furnaces offer the rapid and economic means for the production of plain carbon and alloy steel ingots and castings as well as gray and malleable irons. Top charge and door charge types are both available. LECTROMELT furnaces are built in standard capacities from 100 tons to 25 pounds. Write for details.

PITTSBURGH LECTROMELT FURNACE CORP.
Foot 32nd St. Pittsburgh, Pa.

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings decline to 22,500 tons from 49,925 tons last week; new projects of 33,600 tons double those of a week ago; plate awards call for 735 tons.

AWARDS

NORTH ATLANTIC STATES

- 3500 Tons, Herkimer, N. Y., State grade crossing elimination, New York Central Railroad, contract No. 1, to American Bridge Co., Pittsburgh.
- 3000 Tons, Bayonne, N. J., dry dock tremie trusses for Bayonne Associates, to Bethlehem Steel Co., Bethlehem, Pa.
- 1460 Tons, Bergen County, N. J., viaduct, route 83, section 1, to American Bridge Co., Pittsburgh.
- 580 Tons, Pedricktown, N. J., pier, Delaware Ordnance Division, to Bethlehem Steel Co., Bethlehem, Pa.
- 500 Tons, Lakewood, N. J., State bridge RC-41-3, to American Bridge Co., Pittsburgh.
- 490 Tons, Chautauqua County, N. Y., State highway bridge, FAGM-RC-41-3, to American Bridge Co., Pittsburgh.
- 450 Tons, Philadelphia, building for Philadelphia Savings Fund Society, to Phoenix Bridge Co., Phoenixville, Pa.
- 400 Tons, Providence, R. I., Collins & Aikman weaving building, to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., Boston, contractor.
- 390 Tons, Trenton, N. J., telephone building, to Lehigh Structural Steel Co., Allentown, Pa.
- 250 Tons, Milville, N. J., building for Armstrong Cork Co., to N. A. K. Bugbee Co., Trenton, N. J.
- 200 Tons, Valhalla, N. Y., contract No. 306, equipment supports, Delaware Aqueduct, to American Bridge Co., Pittsburgh.
- 175 Tons, Athens, Pa., machine shop addition for Ingersoll-Rand Co., to American Bridge Co., Pittsburgh.
- 140 Tons, Torrington, Conn., Torrington Mfg. Co. unit, to an unnamed fabricator, through Torrington Building Co., contractor.
- 125 Tons, Trenton, N. J., building for Acme Rubber Co., to American Bridge Co., Pittsburgh.

THE SOUTH

- 150 Tons, Alabama and Mississippi, additions to compressor stations for Southern Natural Gas Co., to Southern Steel Works Co., Birmingham.

CENTRAL STATES

- 1000 Tons, Wood River, Ill., power house, Standard Oil Co. of Indiana, to Joseph T. Ryerson & Son, Inc., Chicago.
- 493 Tons, Sedgwick County, Kan., bridge, to George C. Christopher & Son, Wichita, Kan.
- 475 Tons, Little Falls, Minn., highway bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

- 445 Tons, Illinois, brass mill for Western Cartridge Co., to Wisconsin Bridge & Iron Co., Milwaukee.

- 440 Tons, Highland Park and Detroit, Mich., grade separation, Six Mile Road, for Wayne County Road Commissioners, to American Bridge Co., Pittsburgh.

- 300 Tons, Cincinnati, building for Eastern Machine Co., to L. Schreiber & Sons, Cincinnati.

- 300 Tons, Cleveland, expansion for Eaton Mfg. Co., to Kilroy Structural Steel Co., Cleveland.

- 202 Tons, Lafayette, Ind., State highway bridge 2143, to Central States Bridge & Structural Co., Indianapolis.

- 196 Tons, Van Wert, Ohio, building for National Motor Bearing Co., to International Iron & Steel Co., Evansville, Ind.

- 150 Tons, Superior, Wis., Winslow Southeast Station, to American Bridge Co., Pittsburgh.

- 145 Tons, Indianapolis, bridge No. 3 over Pleasant Run, for Indianapolis Union Railway, to American Bridge Co., Pittsburgh.

- 106 Tons, Cleveland, building for Ohio Bell Telephone Co., to Fort Pitt Bridge Works Co., Pittsburgh.

WESTERN STATES

- 1100 Tons, Los Angeles, Bethlehem Steel Co., Shipbuilding Division, at Terminal Island; warehouse, 1000 tons; welding shop, 100 tons, to Consolidated Steel Corp., Los Angeles.

- 1000 Tons, Long Beach, Cal., plate and structural shops for California Shipbuilding Corp., to Consolidated Steel Corp., Los Angeles.

- 650 Tons, Troy, Mont., Kootenai River State bridge, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

- 450 Tons, Orem, Cal., boiler supports, to Bethlehem Steel Co., Bethlehem, Pa.

- 423 Tons, San Diego, Cal., destroyer base, to Pacific Iron & Steel Co., Los Angeles.

- 350 Tons, Wyoming, bridge No. 979.58 over Weber River, for Union Pacific Railroad Co., to American Bridge Co., Pittsburgh.

- 325 Tons, Opal and Folgar, Idaho, bridges Nos. 28.11, 30.27, 32.31, for Union Pacific Railroad Co., to American Bridge Co., Pittsburgh.

- 260 Tons, Los Angeles, B. F. Goodrich Co. warehouse, to Bethlehem Steel Co., Los Angeles.

- 250 Tons, Donovan and Moxa, Idaho, bridges Nos. 1.61 and 5.33 for Union Pacific Railroad Co., to American Bridge Co., Pittsburgh.

- 160 Tons, Bremerton, Wash., addition machine electric shop building No. 431 for Navv, to American Bridge Co., Pittsburgh.

- 150 Tons, Bremerton, Wash., radio shop at Puget Sound Navy Yard, to Isaacson Iron Works, Seattle, through Henrik Valle, Seattle, contractor.

- 100 Tons, Los Angeles, bridge over North Figueroa Street at Castellar Street, to Minneapolis-Moline Power Implement Co., Minneapolis, through Contracting Engineers, Ltd., Los Angeles, contractor.

- 115 Tons, Garland, Utah, Malad River State

- bridge FAP-205-B (2), to American Bridge Co., Pittsburgh.

HAWAII

- 975 Tons, Kaneohe, seaplane hangar, to an unnamed fabricator.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 5000 Tons, Philadelphia, tremie wall and bottom forms, dry dock No. 5 for Navy; Dry Dock Associates, Inc., contractor.

- 4000 Tons, Brooklyn, Long Island Railroad Atlantic Avenue improvement, contract No. 7.

- 1600 Tons, New York, public school No. 120; Depot Construction Corp., New York, low bidder on contract.

- 800 Tons, Schenectady, N. Y., American Locomotive Co. diesel locomotive shop extension.

- 750 Tons, Erie, Pa., extension building No. 18 for General Electric Co.

- 700 Tons, Danbury, Conn., building for Plasken Co., Inc.

- 525 Tons, Danvers, Mass., High Grade Sylvania Corp.; Brown & Matthews, Inc., New York, contractors.

- 420 Tons, Poughkeepsie, N. Y., factory building for Munitions Mfg. Co.

- 340 Tons, Weathersfield, Conn., Hartford bypass for State.

- 300 Tons, Pine Camp, N. Y., airplane hangar and barracks; John W. Cowper Construction Co., Buffalo, general contractor.

- 300 Tons, Great Bend, N. Y., air corps hangar.

- 280 Tons, Philadelphia, battery storehouse for Navy Department.

- 260 Tons, Springfield, Mass., Monsanto Chemical Co. power house.

- 190 Tons, Philadelphia, highway project, R. C. 41-16; bids close May 28.

- 175 Tons, Brooklyn, building for Sperry-Gyroscopic Co.

- 160 Tons, Fort Covington, N. Y., State bridge RC-41-14.

- 150 Tons, Northbridge, Mass., State bridge.

- 105 Tons, Rochester, N. Y., department store building for Forman Stores.

- 100 Tons, Philadelphia, canopies and tank tower for Government.

- 100 Tons, Riverside, N. Y., South Horicon bridge for Warren County.

- 100 Tons, Springfield, Mass., power house.

THE SOUTH

- 325 Tons, Key West, Fla., piers, submarine base for Navy Department.

- 270 Tons, Huntington, W. Va., foundry buildings for American Car & Foundry Co.

- 135 Tons, Coldwater, Miss., bridge for Illinois Central System.

CENTRAL STATES

- 850 Tons, Mansfield, Ohio, State project No. 37 in Richland County, bridges Nos. RI-30-N-86 and RI-30-N-98; bids May 20.

- 500 Tons, Akron, Ohio, addition to Wingboat Lake hangar; bids in.

- 490 Tons, Lemoyne, Ohio, Wood County State project No. 33; bids May 16.

- 460 Tons, Columbus, Ohio, clothing renovating plant for Army; bids in.

Weekly Bookings of Construction Steel

Week Ended →	May 13, 1941	May 6, 1941	Apr. 15, 1941	May 14, 1940	Year to Date	
					1941	1940
Fabricated structural steel awards	22,500	49,925	23,350	22,250	625,210	273,060
Fabricated plate awards	735	0	120	1,920	67,115	53,185
Steel sheet piling awards	1,580	665	550	425	16,755	16,190
Reinforcing bar awards	13,685	8,410	25,800	7,050	260,940	149,300
Total Letting of Construction Steel	38,500	59,000	49,820	31,645	970,020	491,735

- 400 Tons, Painesville, Ohio, State project No. 36 in Lake County; bids May 20.
 375 Tons, Elyria, Ohio, plant addition for Western Automobile Machine Screw Co.
 300 Tons, Franklin Furnace, Ohio, State project No. 31 in Scioto County; bids May 16.
 210 Tons, East Union, Ohio, State project No. 32, part 2 in Wayne County; bids May 16.
 150 Tons, Green Bay, Wis., State bridge No. 30, FAS-160-A (1).
 140 Tons, Cincinnati, crane runway for Cincinnati Milling Machine Co.
 120 Tons, Warrenhurst, Ill., State bridge, route FA-31, section No. 59-SF.
 110 Tons, St. Louis, boiler house for government hospital.

WESTERN STATES

- 10,500 Tons, including plates, Sunnyvale, Cal., wind tunnel at Moffett Field; bids May 20.
 423 Tons, Hardin, Mont., Big Horn River bridge; bids May 16.
 325 Tons, Friant, Cal., trash racks for Friant Dam (Specification 1510-D); bids May 23.
 130 Tons, Greenough, Mont., Blackfoot River State bridge FAP-237-F-1.
 115 Tons, Bonner, Mont., Big Blackfoot River bridge; bids May 16.

PUERTO RICO

- 254 Tons, San Juan, steel drillage, U. S. Engineer's Office.

NEWFOUNDLAND

- 640 Tons, Argentia, bachelor quarters; George A. Fuller Co., Merritt-Chapman & Scott Corp., New York, contractor.
 284 Tons, Argentia, mess hall and bakery; George A. Fuller Co., Merritt-Chapman & Scott Corp., New York, Contractor.

FABRICATED PLATES

AWARDS

- 235 Tons, Decatur, Ala., barge for Standard Oil Co. of Kentucky, to Ingalls Shipbuilding Corp., Decatur shipyards.
 300 Tons, Avon, Cal., storage tanks, to Western Pipe & Steel Co., San Francisco.
 200 Tons, Honolulu, T. H., tank storage, to Western Pipe & Steel Co., San Francisco.

PENDING PROJECTS

- 1000 Tons, Colfax, Cal., penstocks, Pacific Gas & Electric Co. power plant.
 6000 Tons, Colgate, Cal., penstocks, Pacific Gas & Electric Co. power plant.

SHEET PILING

AWARDS

- 775 Tons, Jefferson County, Ky., State highway bridge over Salt River, to Bethlehem Steel Corp., through Ryan Construction Co., Evansville, Ind., contractor.
 575 Tons, Elmira, N. Y., U. S. Engineer's flood control, Section No. 1, to Bethlehem Steel Co., Buffalo, through Binghamton Construction Co., Binghamton, N. Y.
 250 Tons, San Diego, Cal., pier protection, Navy Base fuel depot, to Bethlehem Steel Co., Los Angeles, through Fred W. Steffgren, Los Angeles, contractor.

PENDING PROJECTS

- 900 Tons, Bremerton, Wash., quay wall at Navy Yard (Specifications 10,424); bids May 28.

Reinforcing Steel

Awards of 13,685 tons; 10,945 tons in new projects.

AWARDS

ATLANTIC STATES

- 966 Tons, Buffalo, grain elevator, to Truscon Steel Co., Youngstown, through James Stewart & Co.
 800 Tons, Astoria, N. Y., grade elimination CH-41-1, to Joseph T. Ryerson & Son, Inc., Chicago, through J. Leopold & Son.
 545 Tons, Somerville, Mass., Sears-Roebuck & Co. warehouse, to Truscon Steel Co., Boston.
 500 Tons, Newark, N. Y., International Telephone Development Co. offices, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.

- 500 Tons, Baltimore, Hochschild & Kohn Co. delivery building, to Bethlehem Steel Co., Bethlehem, Pa.; Morrow Brothers, contractor.
 230 Tons, Herkimer County, N. Y., highway project, to Truscon Steel Co., Youngstown, through Lane Construction Co.
 213 Tons, Portland, Me., store building for W. T. Grant Co., to Truscon Steel Co., Youngstown, through J. M. & C. J. Buckley Co.
 100 Tons, South Boston, structural shop for Navy, to Concrete Steel Co., Boston.

SOUTH AND CENTRAL

- 2000 Tons, New Orleans, ship yards, to Laclede Steel Co., St. Louis, through R. P. Farnsworth & Co., general contractors, New Orleans.
 1900 Tons, South Bend, Ind., Studebaker Corp. aviation engine plants, 600 tons to Jones & Laughlin Steel Corp., 300 tons to Ceco Steel Products Co., remainder to unnamed bidder or bidders; Consolidated Construction Co., Chicago, contractor.
 1200 Tons, Weldon Springs, Mo., Atlas Powder Co. plant, tonnage split equally between Inland Steel Co., Chicago, and Laclede Steel Co., Chicago; Fraser-Brace Engineering Co., contractor.
 1100 Tons, Indianapolis, plant for Bridgeport Brass Co.: 800 tons to Truscon Steel Co., Youngstown, and 300 tons to Hugh J. Baker, Indianapolis, through Stone & Webster Engineering Co.
 400 Tons, Des Moines, Marquette Cement Co. plant, to Sheffield Steel Corp., Kansas City, through Des Moines Steel Co.
 250 Tons, Rock Island, Ill., forge shop for U. S. arsenal, to Inland Steel Co., Chicago.
 208 Tons, Chicago, Buick dynamometer building, to Calumet Steel Co., Chicago.
 150 Tons, Lacrosse, Wis., nurses' home, to Bethlehem Steel Co., Bethlehem, Pa.; Standard Construction Co., contractor.
 150 Tons, Chicago, Coca-Cola garage and storage building, to Bethlehem Steel Co., Bethlehem, Pa.; Krah Construction Co., contractor.
 100 Tons, Sycamore, Ill., highway project No. 23, to Laclede Steel Co., St. Louis; Milburn Bros., Inc., contractor.

WESTERN STATES

- 790 Tons, San Francisco, Valencia Gardens housing project, to Bethlehem Steel Co., San Francisco, through Meyer Construction Co., San Francisco, contractor.
 400 Tons, Great Falls, Mont., grain elevator, to Sheffield Steel Corp., Kansas City; Ryan Construction Co., contractor.
 300 Tons, Shelby, Mont., grain elevator, to Sheffield Steel Corp., Kansas City; Ryan Construction Co., contractor.
 158 Tons, Berkeley, Cal., University of California emergency classroom building, to Ceco Steel Products Co., San Francisco, through Empire Construction Co., San Francisco, contractor.
 125 Tons, Pateros, Wash., Bureau of Reclamation (Invitation C-38,316-A), as follows: 94 tons to Bethlehem Steel Co., San Francisco, 31 tons to Concrete Steel Co., Chicago.

BRITISH WEST INDIES

- 600 Tons, Trinidad, U. S. Army airbase, to Brooklyn; Walsh Construction Co., and Jones & Laughlin Steel Service, Inc., George F. Driscoll Co., New York, contractors.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 1800 Tons, Philadelphia, shipways, Navy Yard, Turner Construction Co., Philadelphia, low bidder.
 1800 Tons, East Aurora, N. Y., highway project, R.C. 41-15, mesh; bids close May 28.
 1500 Tons, Milton, N. Y., highway project, R.C. 41-18, mesh; bids close May 28.
 700 Tons, Philadelphia, highway project, R.C. 41-16, partially mesh; bids close May 28.
 500 Tons, Newfield Station, N. Y., highway project, R.C. 41-17, mesh; bids close May 28.
 400 Tons, Brooklyn, defense housing, Navy yard; Corbetta Construction Co., contractor.
 348 Tons, Hartford County, Conn., viaduct and bridges; bids taken.

- 200 Tons, Cheektowaga, N. Y., township disposal plant No. 5; C. E. Knowles, Gowanda, N. Y., general contractor.
 150 Tons, Port Henry, N. Y., highway project, R.C. 41-19, mesh; bids close May 28.
 150 Tons, Portsmouth, N. H., bridge for Navy.
 100 Tons, East Hartford, Conn., dike.

SOUTH AND CENTRAL

- 430 Tons, Chicago, office building addition for Spiegel, Inc.
 375 Tons, Chicago, substructure, Canal Street bridge; bids May 21.
 300 Tons, Madison, Inc., airport; O'Connor & Simmons, contractor.
 300 Tons, Lansing, Mich., power plant; bids taken.
 200 Tons, Wood River, Ill., Standard Oil Co. of Indiana buildings; bids taken.
 100 Tons, Madison, Wis., Montgomery Ward & Co. store.
 100 Tons, Franklin Furnace, Ohio, State project No. 31 in Scioto County; bids May 16.
 100 Tons, Lemoynne, Ohio, State project No. 33 in Wood County; bids May 16.
 100 Tons, Mansfield, Ohio, State project No. 37 in Richland County; bids May 20.

WESTERN STATES

- 805 Tons, Earp, Cal., Parker Power Plant (Invitation A-44,318-A); bids May 16.
 275 Tons, San Francisco, National Broadcasting Co. studio; Barrett & Hilp, San Francisco, contractor.
 210 Tons, Ogden, Utah, welded steel fabric (Invitation 509-41-195); bids May 15.

Pipe Lines

Ocala Gas Co., Ocala, Fla., plans pressure pipe line extensions in transmission system. Bond issue of \$30,000 is being arranged for this and other work.

United States Engineer Office, Mobile, Ala., asks bids (no closing date stated) for pressure pipe lines for gasoline fueling system at Advanced Flying School, Selma, Ala., including six 25,000-gal. storage tanks and hydraulic displacement fueling system, fueling pits, etc. (Circular 373).

Continental Oil Co., Ponca City, Okla., plans welded steel pipe line from Rincon oil field, Starr and Hidalgo Counties, Tex., to Brownsville, Tex., close to 120 miles, for crude oil transmission to water terminal for tanker service at latter place. Pumping stations will be installed for booster service. This is part of development program of company in oil field area noted.

Southern California Gas Co., 810 South Flower Street, Los Angeles, has authorized appropriation of \$8,950,000 for expansion and improvements, including extensions in main welded pipe lines for natural gas transmission, extensions and improvements in service lines, pipe and gas storage installations, and other work.

United States Engineer Office, Kansas City, Mo., asks bids until May 23 for pressure pipe line system for gasoline distribution for fueling at Sherman Field, Fort Leavenworth, Kan. (Circular 297).

Kansas Pipe Line & Gas Co., recently merged into Kansas-Nebraska Natural Gas Co., Phillipsburg, Kan., has failed to proceed with recent application to build a welded steel pipe line from Hugoton, Kan., to Mesabi, Minn., iron-mining area, about 2300 miles, for natural gas transmission, and commission has ordered application dismissed without prejudice. Proposed line was estimated to cost about \$14,500,000.

United States Engineer Office, Portland, Ore., closes bids May 23 for pressure pipe lines for gasoline distribution for fueling service at Portland-Columbia airport, including gasoline storage facilities (Circular 489).

Bureau of Yards and Docks, Navy Department, Washington, has divided order for steel pipe for new water line from Florida mainland to Key West, Fla., between Youngstown Sheet & Tube Co., and American Rolling Mill Co. Entire project will cost close to \$3,000,000. Parsons, Klapp, Brinckerhoff & Douglas, 142 Maiden Lane, New York, are consulting engineers.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			
TERNES, M'FG.															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢				(Detroit = 2.70¢)					
PLATES										(Coatesville and Claymont = 2.10¢)					
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)									
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Spring	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)							
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢				(Terre Haute, Ind. = 2.15¢)									
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton
3 in. to 12 in.\$52.00
12 in. to 18 in. 54.00
18 in. and over..... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.) *Per Lb.*
Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 47/64 in. \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)
20x14 in. 20x28 in.

8-lb. coating I.C....	\$6.00	\$12.00
15-lb. coating I.C....	7.00	14.00
20-lb. coating I.C....	7.50	15.00
25-lb. coating I.C....	8.00	16.00
30-lb. coating I.C....	8.63	17.25
40-lb. coating I.C....	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg
Standard wire nails.....\$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.
Annealed fence wire.....\$3.05

Base Column
Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties.....59
Galvanized barbed wire†..... 70
Twisted barbless wire..... 70

*15% gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
½ in. and smaller by 6 in. and shorter68
9/16 and 5/8 in. by 6 in. and shorter66
¾ to 1 in. by 6 in. and shorter 64
1½ in. and larger, all lengths..62
All diameters over 6 in. long..62
Lag, all sizes.....65

Plow bolts68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:
½ in. and smaller.....66
9/16 to 1 in. inclusive.....63
1½ to 1½ in. inclusive.....61
1½ in. and larger.....60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
7/16 in. and smaller.....	68	
½ in. and smaller.....	66	
¾ in. through 1 in.	64	
9/16 to 1 in.	63	
1½ in. through 1½ in. 61	62	
1½ in. and larger.....	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Stove bolts in packages, with nuts attached71
Stove bolts in bulk.....80

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 68
Upset set screws, cup and oval points 74
Milled studs 52
Flat head cap screws, listed sizes 43
Filister head cap screws, listed sizes 56

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	May 7	May 8	May 9	May 10	May 12	May 13
Copper, Electrolytic¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York²	52.25	52.125	52.25	....	52.25	52.25
Zinc, East St. Louis....	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis³.....	5.70	5.70	5.70	5.70	5.70	5.70

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits pig	52.75	55.00
Copper		
Electro	13.00	13.50
Castings	12.50	13.00
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks.	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	9.10
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt, 98-99%	18.00	18.50
Solder		
½ and 1½.....	32.00	32.75
Babbitt		
Anti-friction grade ..	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	10.625	11.25
Hvy. and wire.....	9.625	10.025
Light and bottoms..	8.625	9.125
Brass		
Heavy	6.125	6.625
Light	5.125	5.875
No. 1 yel. turn.....	5.875	6.375
No. 1 red or compo. turnings	9.375	10.375
Hvy. Mach. compo...	9.625	9.850
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00-12.00	
Sheet	12.00-13.50	
Zinc	5.10	

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$180-\$182, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33¼; on brass sheets and rods, 40; on brass tubes, 33¼, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade2.70c.

Delivered, Detroit2.80c.

S.A.E. Series Numbers Alloy Differential, per 100 Lb.
2000 (1.5 Ni)\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)...	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip.....	23.50c.	21.50c.
Cold rolled strip.....	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.....	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

No.	304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

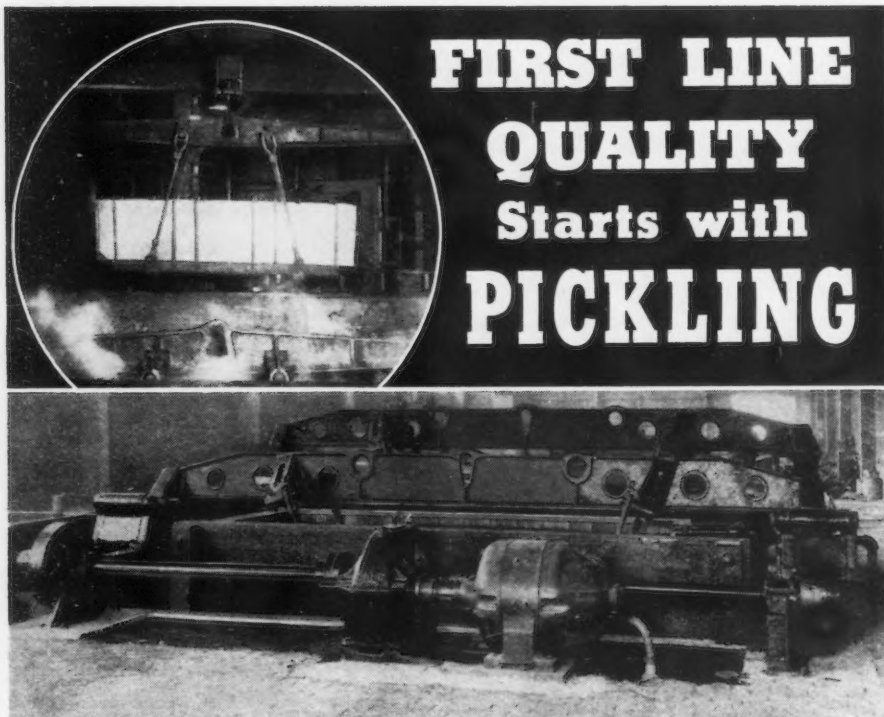
Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.



FIRST LINE QUALITY Starts with PICKLING

WHEELING BRONZE SHEET PICKLERS—

are outstanding in performance—because of the oscillating feature—found only in this line of Batch Picklers.

Use this type of mechanical pickler to reduce your pickling cost.

WRITE TODAY

WHEELING BRONZE CASTING CO.



WHEELING, W. VA.

PRICES

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago..	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld, Cold Drawn	Hot Rolled	Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82	....	....
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26	....	....
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23	\$9.72	....
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64	11.06	....
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38	....
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54	13.79	....
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01	15.16	....
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54	16.58	....
3 in. o.d. 12 B.W.G.	21.42	18.59	17.54	....
3 1/2 in. o.d. 12 B.W.G.	22.48	19.50	18.35	....
3 3/4 in. o.d. 11 B.W.G.	28.37	24.62	23.15	....
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66	....
4 1/2 in. o.d. 10 B.W.G.	43.04	37.35	35.22	....
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25	....
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14	....

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = \$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	33
1/4 to 3/8 in.	59	40 1/2
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron	Black	Galv.
1/4 and 3/8 in.	+9	+33
1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Lap Weld

Steel	Black	Galv.
2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2
7 and 8 in.	65	52 1/2
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron	Black	Galv.
2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17
9 to 12 in.	28 1/2	12

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	38 1/2
1/4 to 3/8 in.	56 1/2	42 1/2
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron

1/4 and 3/8 in.	+10	+46
1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

	Black	Galv.
7 and 8 in.	65 1/2	53
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

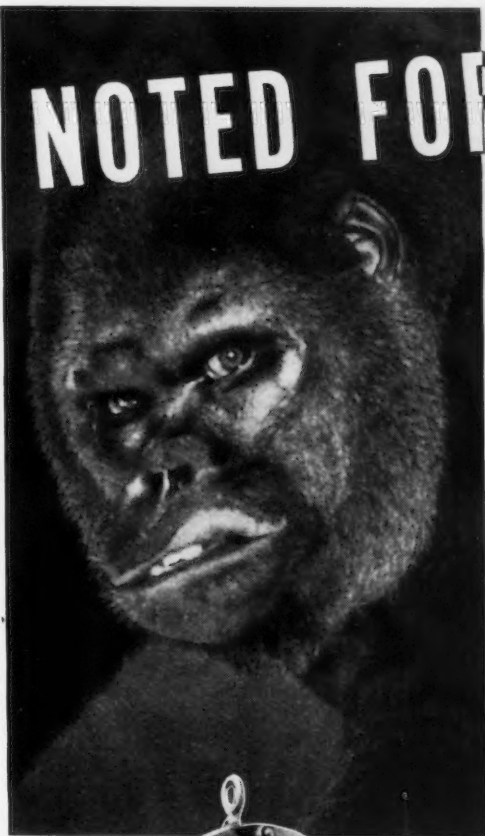
Wrought Iron

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21
7 and 8 in.	38 1/2	21 1/2
9 to 12 in.	32	17 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

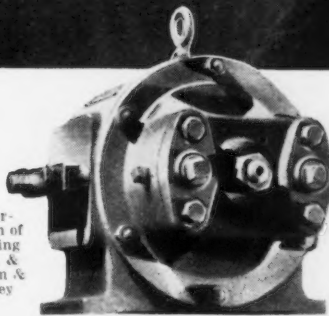
F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

NOTED FOR POWER

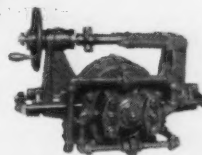


IN these jittery days, you designers and manufacturers haven't time to fiddle with design changes. Fortunately, Hele-Shaw fluid power furnishes a ready answer to some of your problems. The Hele-Shaw Fluid Power Pump delivers oil under pressure for operating presses, rams, reciprocating devices and similar mechanisms. Pressures as high as 3000 pounds per square inch can be obtained direct from the pump. But suppose you don't need 3000 pounds? You can easily adjust the Hele-Shaw pump regulator quickly to your changed requirements, without disturbing your machine or the Fluid Power piping. Fluid Power can be Gargantuan—or as gentle as a kitten. Take advantage of this and the many other benefits of Hele-Shaw Fluid Power when you build or operate machines for peace-time or war-time production.

By Permission of Ringling Bros. & Barnum & Bailey

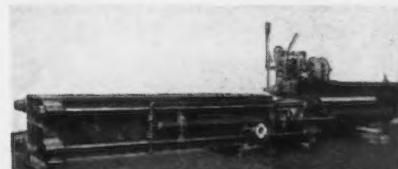


NOTE IT FOR POWER



Hele-Shaw Pump with Type GAM regulator. This one of many Hele-Shaw regulators, permits a wide range of pressures on the work stroke, independent of the pull-back pressure.

THE Hele-Shaw Fluid Power Pump



Stepping press for the cellophane industry uses Hele-Shaw Pump with a hand-operated Hele-Shaw GAM Control. Control regulates volume and pressure independently, eliminating need for auxiliary operating valves.

OTHER A-E-CO PRODUCTS: LO-HED HOISTS, TAYLOR STOKERS, MARINE DECK AUXILIARIES



AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50% . . .	\$4.75
Old range, non-bessemer, 51.50% . . .	4.60
Mesaba, bessemer, 51.50% . . .	4.60
Mesaba, non-bessemer, 51.50% . . .	4.45
High phosphorus, 51.50% . . .	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore,
Exclusive of Duty

Per Unit

African, Indian, 44 to 48% Mn.	57c. to 61c.
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African, Indian, 49 to 51% Mn.	60c. to 65c.
Brazilian, 46 to 48% Mn. . .	54c. to 59c.
Cuban, del'd, duty free, 51% Mn.	67½c. to 71c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered . . .	\$23 to \$24
Tungsten, domestic, scheelite, delivered . . .	\$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton; South African (low grade) . . .	Nom.
Rhodesian, 45% . . .	\$25.00
Rhodesian, 48% . . .	\$28.00 to \$30.00

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton . . .	\$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton . . .	\$40.00
Light rails (from rail steel), gross ton . . .	39.00

Base per Lb.

Cut spikes . . .	3.00c.
Screw spikes . . .	4.55c.
Tie plates, steel . . .	2.15c.
Tie plates, Pacific Coast . . .	2.30c.
Track bolts, steam railroads . . .	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts) . . .	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail . . .	\$20.00 to \$21.00
Domestic, f.o.b. Ohio River land- ing barges . . .	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines . . .	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid . . .	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illi- nois and Kentucky mines . . .	31.00
As above, in bags, f.o.b. same mines . . .	32.60

REFRACTORIES

Fire Clay Brick Per 1000 f.o.b. Works	
Super-duty brick at St. Louis . . .	\$60.80
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois . . .	47.50
First quality, New Jersey . . .	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois . . .	42.75
Second quality, New Jersey . . .	9.00
No. 1 Ohio . . .	39.90
Ground fire clay, per ton . . .	7.10

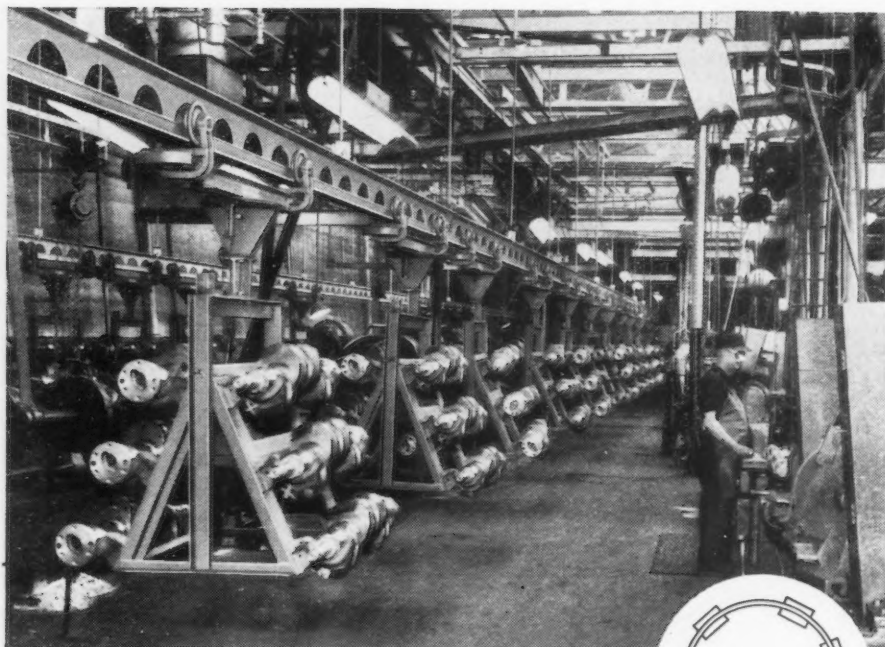
Silica Brick	
Pennsylvania . . .	\$47.50
Chicago District . . .	55.10
Birmingham . . .	47.50
Silica cement, net ton (Eastern) . . .	8.55

Chrome Brick Net per Ton	
Standard f.o.b. Baltimore, Plym- outh Meeting and Chester . . .	\$50.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa. . .	

Magnesite Brick	
Standard f.o.b. Baltimore and Chester . . .	\$72.00
Chemically bonded, f.o.b. Balti- more . . .	61.00

Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) . . .	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks . . .	\$40.00
Domestic, f.o.b. Chewelah, Wash (in bulk) . . .	22.00

*None available.

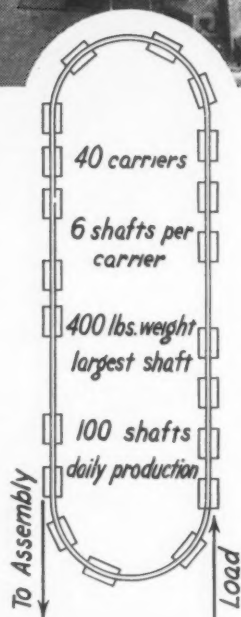


AN INEXPENSIVE OVERHEAD SYSTEM FOR STRAIGHT-LINE PRODUCTION

By replacing old floor-type handling equipment with a modern Cleveland Tramrail overhead-rack-carrier system, the many advantages of straight-line production were achieved recently in the manufacture of Diesel motor crankshafts.

The shafts are conveyed on hand-pushed turn-table type carriers to the various machine tools. Machining operations are performed in logical sequence. After traveling the Tramrail circuit, the shafts are ready for the assembly line.

This system has completely reorganized the department and the hard time-consuming juggling and tugging of heavy skid-loads of shafts from machine to machine is eliminated. Production has been stepped up and costs cut.



CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1115 East 283rd St. Wickliffe, Ohio



CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

Other products: CLEVELAND CRANES and STEELWELD MACHINERY

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton
Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size
50% (carload lots, bulk).....\$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload, lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio
10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio
5.00 to 5.50%.....\$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon17.50c.
1% carbon18.50c.
0.10% carbon20.50c.
0.06% carbon21.00c.

Spot prices are ¼ c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†
Ferrochromium, per lb. contained chromium f.o.b. Niagara Falls, N. Y., ton lots\$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C. f.o.b. furnace carload and contract, per net ton.....\$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C. f.o.b. furnace, carload and contract per net ton.....\$157.50

*Spot prices are \$5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24% per gross ton, \$3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo., f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

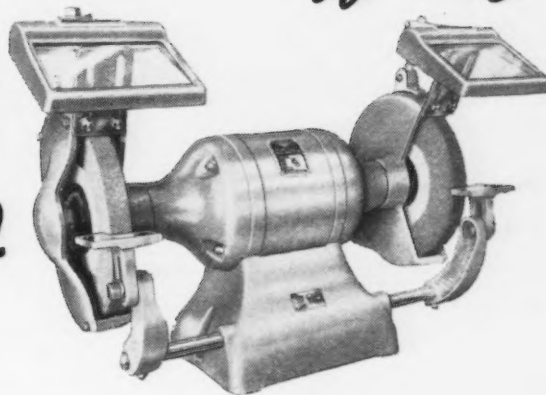
FUEL OIL

No. 3, f.o.b. Bayonne, N. J....4.90c.
No. 6, f.o.b. Bayonne, N. J....3.21c.
No. 5 Bur. Stds., del'd Chicago...3.25c.
No. 6 Bur. Stds., del'd Chicago...2.75c.
No. 3 distillate, del'd Cleveland...5.75c.
No. 4 indus., del'd Cleveland...5.375c.
No. 5 indus., del'd Cleveland...5.125c.
No. 6 indus., del'd Cleveland...4.875c.

NOW... The Greatest Grinder Value Ever Offered

Heavy Duty 1 H. P. Motor

Only \$87.50



ILLUMINATED EYE SHIELDS
EXTRA — \$12.00 PAIR

Now ready to take over tough grinding jobs throughout your plant is this Millers Falls masterpiece, No. 810 Grinder. Rated at 1 h.p., it takes heavy overloads *without stalling!*

Specially designed for smooth, continuous production service. Check its specifications... *see it at work on your own operations*... and you'll agree it's beyond question *the greatest grinder value ever offered*. Let us arrange a demonstration. Write or wire today!

* * * * *

New Millers Falls Heavy Duty 10" Bench Grinder No. 810 Motor: One h.p.; not Universal—AC only; voltages 110, 220, 440... 50 or 60 cycle... single or three phase. No-Load Speed 1725 rpm. Ball bearings labyrinth-sealed for constant high efficiency.

Spindle height—11". Wheels—10" x 1" x ¾". Extremely rugged construction throughout. Weight 155 lbs.

Standard equipment: heavy enclosed safety guard; two-way adjustable work rest; chip breaker; two wheels, one coarse and one fine, 10" x 1" x ¾". Price, any voltage as above, \$87.50.

No. 8100 Pedestal—Makes No. 810 Grinder an independent floor unit. Complete with large-capacity water pot for cooling work—\$22.50.

No. 8610 De Luxe Illuminated Eye Shields—As illustrated. Per pair \$12.00.

MILLERS FALLS COMPANY

GREENFIELD  MASSACHUSETTS

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$6.00 to \$6.25
Foundry, f.o.b. Connellsville, prompt	\$6.75 to \$7.00
F'dry, by-product, Chicago.....	10.50
F'dry, by-product, New England	13.75
Foundry, by-product, Newark or Jersey City	\$12.45 to 12.95
F'dry, by-product, Philadelphia.	12.13
F'dry, by-product, Cleveland...	12.05
F'dry, by-product, Cincinnati...	11.00
Foundry, Birmingham	8.50
F'dry, by-product, St. Louis	
	\$10.75 to \$11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export	£29 16s. 3d.
Tin plate, per base box.	32s. to 33s.
Steel bars, open hearth.	£16 10s.
Beams, open hearth....	£19 10s.
Channels, open hearth....	£19 10s.
Angles, open hearth....	£15 10s.
Black sheets, No. 24, gage	
£22 5s. max.*	£22 5s. min.**
Galvanized sheets, No. 24 gage	
£25 12s. 6d max.*;	£25 12s. 6d. min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....
Brooklyn.....	27.50	.....	.....	28.00	.....
Jersey City.....	26.53	26.03	27.53	27.03	.....
Philadelphia.....	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....
Everett, Mass.....	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.....	25.00	24.50	26.00	25.50	.....
Steelton, Pa.....	25.00	24.50	26.00	25.50	29.50
Birdsboro, Pa.....	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md...	25.00	24.50	.....	.....	.....
Erie, Pa.....	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpsville, Pa.††.....	24.00	23.50	24.50	24.00	.....
Buffalo.....	24.00	23.00	25.00	24.50	29.50
Cincinnati.....	24.44	24.61	.....	25.11	.....
Canton, Ohio.....	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio.....	25.94	25.44	26.44	25.94	.....
St. Louis.....	24.50	24.02	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	.....
Granite City, Ill.....	24.00	23.50	24.50	24.00	.....
Cleveland.....	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio.....	24.00	23.50	.....	24.00	.....
Toledo.....	24.00	23.50	24.50	24.00	.....
Youngstown††.....	24.00	23.50	24.50	24.00	.....
Detroit.....	24.00	23.50	24.50	24.00	.....
St. Paul.....	26.63	.....	27.13	26.63	.....
Duluth.....	24.50	.....	25.00	24.50	.....
Birmingham.....	20.38	19.00	25.00	.....	.....
Los Angeles, San Francisco and Seattle	27.50	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....
Montreal†.....	27.50	27.50	.....	28.00	.....
Toronto†.....	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$23.50

CHARCOAL

Lake Superior fce.....\$28.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

††Pittsburgh Coke & Iron and Struthers furnaces are quoting \$24.50 a ton for No. 2 foundry, basic and malleable, and \$25.00 a ton for bessemer iron at Sharpsville and Youngstown.

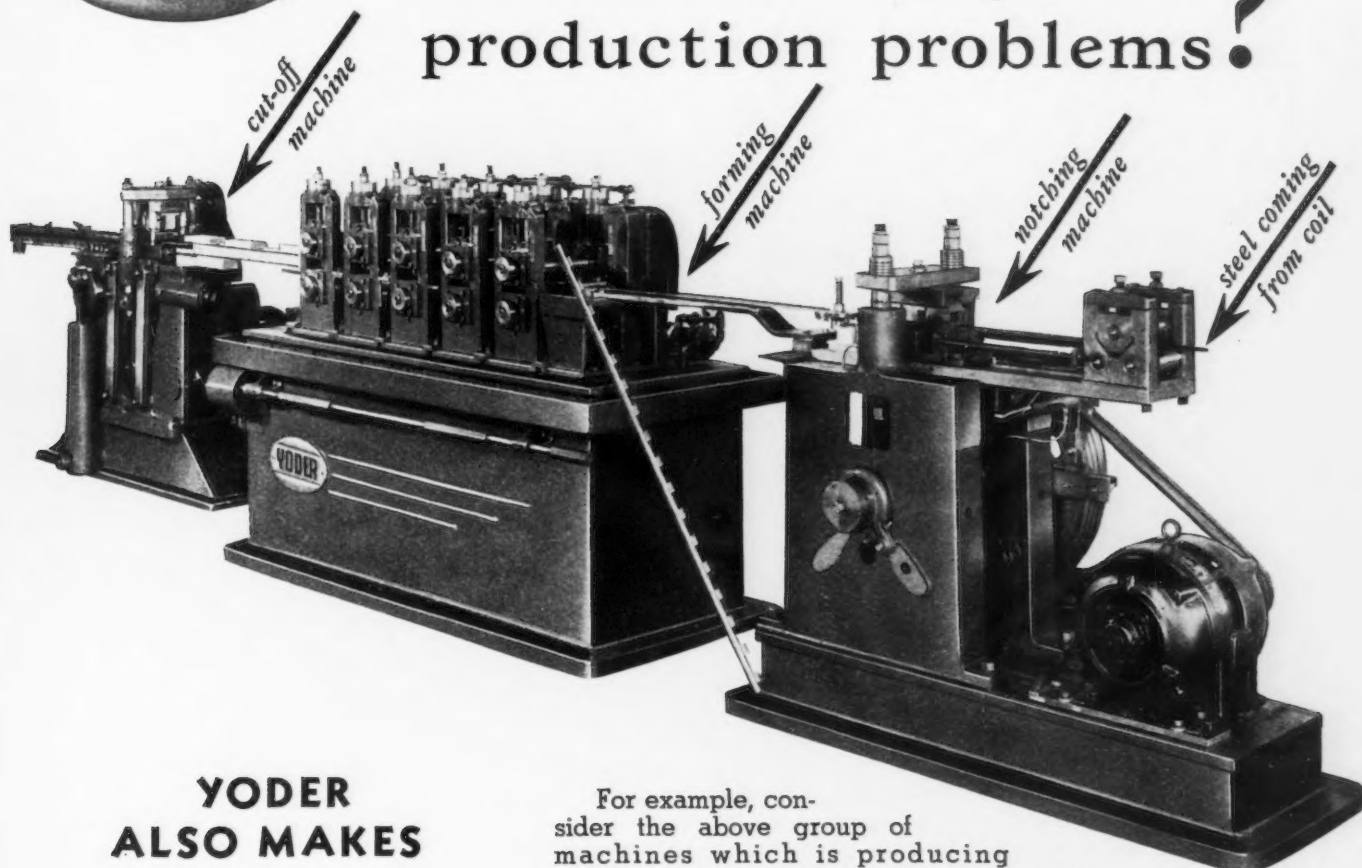
WAREHOUSE PRICES

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets hot rolled.....	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$4.30
Sheets, cold rolled.....	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.12	4.35	4.23	6.50
Sheets, galvanized.....	4.75	4.60	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.24	4.75	4.98	5.25
Strip, hot rolled.....	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	4.99	3.65	3.73	.....
Strip, cold rolled.....	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates.....	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.15
Structural shapes.....	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.15
Bars cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100.	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 6 bundles. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.43.

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Bending Machines

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THE IRON AGE, May 15, 1941—133

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Torrington Mfg. Co.**, Torrington, Conn., special machinery and parts, metal products, etc., has let general contract to Torrington Building Co., 187 Church Street, for one-story addition, 102 x 221 ft. Cost over \$125,000 with equipment.

Boston Gear Works, Inc., 14 Hayward Street, North Quincy, Mass., cut gears, chain drives, etc., has let general contract to Austin Co., Cleveland, engineer and contractor, for two-story and basement addition, about 40 x 85 ft. Cost close to \$65,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, has let general contract to Aberthaw Co., 80 Federal Street, Boston, for new drydock and auxiliary structures at Portsmouth, N. H., Navy Yard, at \$2,500,000 exclusive of equipment.

Armour & Co., Union Stock Yards, Chicago, meat packers, will ask bids soon on new one and multi-story factory branch, storage and distributing plant at Providence, R. I. Cost over \$175,000 with equipment.

Kerite Insulated Wire & Cable Co., Day Street, Seymour, Conn., has let general contract to H. Wales Lines Co., 34 State Street, Meriden, Conn., for one-story addition, 75 x 140 ft. Cost over \$75,000 with equipment. Main offices are at 30 Church Street, New York.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 20 for one shearing machine (Schedule 6618), coil-winding machine (Schedule 6621), wood-working lathe (Schedule 6627), engine lathe (Schedule 6628), forging hammer (Schedule 6631), four floor-type grinders (Schedule 6634), gap lathe (Schedule 6638), pyramid-type roll machine (Schedule 6646) all motor-driven, for Boston, New York, Philadelphia, Norfolk, Va., or Western yards.

Geometric Tool Co., Blake and Valley Streets, New Haven, Conn., precision tools, has let general contract to Fusco-Amatruda Co., 59 Amity Road, for two-story addition. Cost over \$50,000 with equipment. Leo F. Caproni, 1221 Chapel Street, is architect and engineer.

Southern Kraft Corp., 220 East Forty-second Street, New York, kraft paper products, subsidiary of International Paper Co., same address, plans expansion in branch mill at Georgetown, S. C., including new units for increased production in pulp mill and finished paper-board division. New paper-making machine and auxiliary equipment will be installed. Cost close to \$2,000,000 with equipment.

Sperry Gyroscope Co., Inc., 40 Flatbush Avenue Extension, Brooklyn, precision instruments and parts, has filed plans for new two-story plant, 100 x 208 ft., at 22-52 Chapel Street. Cost over \$150,000 with equipment. George A. Boehm, 2 West Forty-fifth Street, New York, is architect. Company also plans purchase of about 124 acres on Marcus Avenue and Lakeville Road, Lake Success and North Hempstead, L. I., as site for large plant.

Robins Dry Dock & Repair Co., Erie Basin, Brooklyn, will take bids soon on general contract for one-story forge and blacksmith shop, 100 x 150 ft., at 2-46 Halleck Street. Bids previously received have been rejected. Cost over \$80,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Great Atlantic & Pacific Tea Co., Inc., 420 Lexington Avenue, New York, has leased one-story building now in course of erection on five-acre tract at Maspeth, L. I., by Hamabe Realty Co., about 157,000 sq. ft. of floor space, for new bulk storage and distributing plant, with section, 185 x 215 ft., for a baking plant. Cost over \$250,000 with traveling ovens, mixers, conveyors and other mechanical-handling equipment.

Bureau of Supplies and Accounts, Navy

Department, Washington, asks bids until May 20 for radial ball bearings, thrust ball bearings, angular contact ball bearings and steel ball bearings (Schedule 6617) for Brooklyn and Mare Island yards.

Niagara, Lockport & Ontario Power Co., Electric Building, Buffalo, has arranged fund of about \$2,000,000 for expansion and improvements in power plants and system, including transmission and distributing lines, power substations and other structures.

Remington-Rand, Inc., 465 Washington Street, Buffalo, has asked bids on general contract for three-story addition to plant No. 2 at Ilion, N. Y., 50 x 160 ft. Cost about \$150,000 with equipment. Haskell & Considine, Hulett Building, Elmira, N. Y., are architects.

Russell Miller Milling Co., foot of Childs Street, Buffalo, has let general contract to C. F. Haglin & Sons, Inc., National Building, Minneapolis, Minn., for addition to flour mill for expansion in storage and distributing department, including about 36 new steel bins, conveyors and other mechanical-handling facilities. Cost over \$85,000 with equipment.

Magor Car Corp., 50 Church Street, New York, railway and industrial cars, trucks, etc., has approved plans for one-story addition, 35 x 275 ft., to plant at Athenia. Cost close to \$80,000 with equipment. H. D. Allen, 105 Halsey Street, Newark, N. J., is consulting engineer.

New York Shipbuilding Corp., Camden, N. J., plans two new shipways, shops and other buildings, supplementing three shipbuilding berths now in course of construction. Additional shop units will increase fabricating and machine divisions, foundry and other iron and metal-working departments. Entire program will cost about \$12,000,000, including work in progress and completed, and will triple capacity of yard for construction of vessels for Navy Department. Appropriations to make up fund noted have been secured through Government.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until May 20 for arbor bench presses (Circular 2247); until May 21 for nails (Circular 2250), malleable iron or steel unions, and double hub sleeves (Circular 2252).

American Bridge Co., Trenton, N. J., has filed plans for one-story addition, 80 x 400 ft., for expansion in steel fabricating works. Cost close to \$350,000 with equipment.

Bloomfield Tool Corp., Nelson Street, Bloomfield, N. J., gages and other precision tools, plans immediate expansion for production of tools used in aircraft industry for Government. Cost about \$220,000. Fund in that amount has been secured through Defense Plant Corp., Washington, Federal agency.

Sun Shipbuilding & Drydock Co., Chester, Pa., has let contract to Raymond Concrete Pile Co., 140 Cedar Street, New York, for new shipways for increased capacity for vessels for United States Maritime Commission, to include machine and fabricating shops, foundry and other mechanical units. Cost about \$2,000,000. Appropriation in that amount has been secured through Government.

Barrett Co., Thirty-sixth Street and Grays Ferry Avenue, Philadelphia, coal tar chemical products, has acquired adjoining tract for one and multi-story additions for increased output of certain chemical specialties. Cost over \$600,000 with equipment.

Hamilton Watch Co., Lancaster, Pa., plans three-story and basement addition for expansion in parts production and assembling divisions; also will build new multi-story office building. Cost over \$300,000 with equipment.

Precision Products Co., Corry, Pa., mechanical specialties, plans new one-story plant on neighboring site. Cost close to \$50,000 with equipment.

Forney Machine Co., Elm Street, New Castle, Pa., machinery and parts, plans one-story

addition. Cost about \$45,000 with equipment.

National Archives, Washington, asks bids until May 28 for one processing machine for 35-mm. and 16-mm. films (Circular 504).

James J. Lacy Co., 1401 Block Street, Baltimore, iron castings, has let general contract to E. Eyring & Sons Co., 808 South Conkling Street, for one-story foundry addition, 46 x 70 ft. Cost about \$45,000 with equipment. John F. Eyring, 810 South Conkling Street, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 20 for one upright drilling machine (Schedule 6624), three bench lathes (Schedule 6632), radial drilling machine, 9-in. column (Schedule 6652), bench milling machine (Schedule 6644), toolroom lathe (Schedule 6639), all motor-driven; one hand-operated slip roll forming machine (Schedule 6635), hand-operated tube-bending machine (Schedule 6641); steel packing case strapping (Schedule 6661); until May 22 for steel wool (Schedule 6650), about 120,000 galvanized iron buckets (Schedule 6626) for Eastern and Western Navy yards.

Hygrade Sylvania Corp., Salem, Mass., has awarded contract to Austin Co., Cleveland, for a new fluorescent lamp manufacturing plant at Danvers, Mass. Structure will be two stories with about 100,000 sq. ft. of floor space and will cost \$500,000. When completed all fluorescent manufacturing facilities will be transferred to Danvers plant which will release more space in Salem factory for manufacture of incandescent lamps and special products.

The South

• **Air Reduction Co., Inc.**, 60 East Forty-second Street, New York, acetylene, industrial oxygen, atmospheric gas products, etc., plans new works at Louisville for production of calcium carbide for raw material supply for new mill of E. I. du Pont de Nemours & Co., rubber chemicals division, Wilmington, Del., for manufacture of neoprene synthetic rubber, which will be located on neighboring site. Latter plant will cost over \$10,000,000 with machinery, instead of smaller sum, previously noted in these columns. Calcium carbide works will cost about \$2,000,000 with equipment.

Savannah Machinery & Supply Co., Shipbuilding Division, Indian Street, Savannah, Ga., has let general contract to Savannah Steel Products Co., Savannah, for expansion in shipyard, including new docks, four one-story shops for machine service, and miscellaneous work. Cost close to \$100,000 with equipment. A. Thomas Bradbury, William-Oliver Building, Atlanta, Ga., is architect.

Constructing Quartermaster, Fort Monroe, Va., asks bids until May 27 for one 250,000-gal. elevated steel tank.

South Mississippi Electric Power Association, Ellisville, Miss., O. L. Watson, president, recently organized, plans new steam-electric generating plant near Hattiesburg, Miss., for power supply for electric distribution rural cooperative organizations in southern part of State. Cost over \$1,000,000 with equipment. Financing will be arranged through Federal aid. Gibbs & Hill, Pennsylvania Station, New York, are consulting engineers.

Construction Quartermaster, Fort Benning, Columbus, Ga., has let general contract to Pearce-Williams Construction Co., Columbus, for one-story ordnance shop and boiler plant at local field, at \$74,200 exclusive of equipment.

Southern Gas Lines, Inc., Monroe, La., has approved plans for new compressor plant for booster service on Alexandria-Monroe Highway, near Clark, La. Cost about \$200,000 with gas engines, compressors and auxiliary equipment. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is engineer and contractor.

Southern Aircraft Corp., Garland, Tex.,

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airplanes and parts, plans expansion, including new tools and equipment. Cost about \$100,000. Financing in that amount has been arranged through RFC.

Coastal Refining Co., Port Isabel, Tex., has approved plans for addition to oil refinery, including equipment for increased capacity. Cost close to \$100,000 with machinery.

Grand River Dam Authority, Vinita, Okla., plans expansion in hydroelectric generating station on Grand River, near Pensacola, Okla., including new turbine-generator unit and auxiliary equipment. Work will be carried out in conjunction with transmission line extensions, power substations and other operating structures, entire project to cost about \$2,363,000. Financing will be arranged through Federal aid. Holway & Neuffer, 307 East Eighteenth Street, Tulsa, Okla., are consulting engineers.

W. S. Dickey Clay Mfg. Co., New York Life Building, Kansas City, Mo., structural clay products, has begun excavations for rebuilding branch plant at Texarkana, Tex., destroyed by fire several weeks ago, to include one-story units for storage and grinding department, mechanical dryer division, molding room, machine shop, rotary kilns and other structures. Cost close to \$275,000 with machinery. Alfred Benberg, first noted address, is architect.

Central States

• **Defiance Machine Works**, Defiance, Ohio, machine tools and parts, has let general contract to Baker-Shindler Contracting Co., Defiance, for one-story addition, about 15,000 sq. ft. of floor space, for extensions in foundry and pattern shop. Cost close to \$50,000 with equipment.

Willys-Overland Motors, Inc., Wolcott Boulevard, Toledo, Ohio, plans expansion and improvements, including conversion of about one-half of present forge shop for production of aluminum parts for airplanes for Government; also for installation of machinery and facilities in other plant divisions for similar line of output. Cost about \$2,170,000. Financing in that amount will be provided through Defense Plant Corp., Washington.

Carey Machine Co., 9518 Cassius Avenue, Cleveland, machinery and parts, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for one-story addition, 70 x 190 ft., for expansion. Cost close to \$70,000 with equipment. Ernest McGeorge and T. V. Hargett, 9400 Quincy Avenue, are architects and engineers.

Harlow B. Salter, Marysville, Ohio, and associates have organized company to construct and operate plant at Bellefontaine, Ohio, for production of iron castings, rough plumbing fixtures and allied specialties. Contract for one-story building has been let to Knowlton Construction Co., Bellefontaine. Homer B. Fuston, Bellefontaine, is interested in company and will be in charge of production.

General Rivet & Machine Co., Elyria, Ohio, has let general contract to T. J. Hume Construction Co., 435 Hamilton Avenue, Lorain, Ohio, for one-story addition, 40 x 200 ft. Cost over \$85,000 with equipment. Milo S. Holdstein, Hickox Building, Cleveland, is architect.

Maxon Premix Burner Co., 2520 South Mulberry Street, Muncie, Ind., oil burners and parts, has awarded general contract to A. J. Glazer, 401 South Lincoln Street, for one-story addition. Cost close to \$50,000 with equipment.

Ayreshire-Patoka Coal Co., Clinton, Ind., plans rebuilding tippie at coal-mining properties near city, recently destroyed by fire. Loss over \$100,000 with machinery.

Anheuser-Busch, Inc., 721 Pestlozzi Street, St. Louis, brewer, has let general contract to T. D. Bryant Construction Co., Dierks Building, Kansas City, Mo., for one-story addition, 100 x 120 ft., to storage and distributing plant at Kansas City. Cost close to \$50,000 with equipment.

Benson Mfg. Co., Eighteenth Street and Agnes Avenue, Kansas City, Mo., aircraft equipment and parts, has let general contract to Fogel Construction Co., Reliance Building, for one-story addition, 120 x 125 ft., for expansion in parts assembling division. Cost close to \$100,000 with equipment. Boillot & Lauck, 1012 Baltimore Street, are architects.

Olds Motor Works, Division of General Motors Corp., Lansing, Mich., plans expansion and revision in plant to provide about 200,000 sq. ft. of floor space for production of machine guns and parts for War Department. Cost over \$400,000 with equipment.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has let general contract to Barton-Malow Co., 1900 East Jefferson Avenue, for addition, 30 x 42 ft., to main power house. Work will include new coal bunker, coal-handling machinery and other equipment. Cost about \$75,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

Dalzen Tool & Mfg. Co., 511 Leib Street, Detroit, burners, broaches and kindred equipment, has let general contract to Haberkorn-Barry Co., 2658 Porter Street, for new one-story plant, including office building, on Eight-Mile Road, near city limits. Cost over \$65,000 with equipment. H. E. Beyster Corp., General Motors Building, is architect and engineer.

Ann Arbor Foundry Co., Ann Arbor, Mich., gray iron castings, etc., has asked bids on general contract for one-story addition. Cost close to \$45,000 with equipment. F. Houston Colvin, 317 East Ann Street, is architect.

Metal Mouldings Corp., 4559 Wesson Avenue, Detroit, metal products, has let general contract to Cooper Construction Co., Macabees Building, for new one-story plant. Cost about \$235,000 with equipment.

Chicago Transformer Co., 3501 Addison Street, Chicago, electric transformers and other electrical equipment, has let general contract to J. Emil Anderson & Son, 3659 West Belle Plaine Avenue, for one-story addition, 120 x 235 ft., and improvements in present plant. Cost over \$100,000 with equipment. Engineering Systems, Inc., 221 North LaSalle Street, is architect and engineer.

Tuttle & Kift, Inc., 2626 West Washington Street, Chicago, heating specialties, has let general contract to Campbell, Lowrie & Lautermilch Corp., 400 West Madison Street, for new one-story and basement plant on Monitor Avenue. Cost close to \$90,000 with equipment. Olsen & Urbain, 8 East Huron Street, are architects.

Dynatomic Corp., 3307 Fourteenth Avenue, Kenosha, Wis., dynamometers and other precision equipment, has let general contract to Anton J. Larson, French Drive, for one-story addition, 36 x 130 ft. Cost close to \$50,000 with equipment.

District Public Works Officer, Ninth Naval District, Great Lakes, Ill., asks bids until May 20 for buildings at Naval Reserve Aviation Base, Minneapolis, including steel hangar, 202 x 362 ft.; two-story assembly and repair shops, 102 x 162 ft.; paint and dope spray building, 33 x 63 ft.; oil storage and distributing building, 32 x 82 ft.; steam power house, 40 x 46 ft., and auxiliary structures (Specifications 10297).

Atkinson Milling Co., Flour Exchange Building, Minneapolis, has awarded general contract to Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., for six-story addition to flour mill at 3745 Hiawatha Avenue. Cost over \$100,000 with equipment. An addition for storage and distribution will be erected soon.

Hanson Scale Co., 525 North Ada Street, Chicago, automatic scales and parts, has asked bids on general contract for two-story addition, 75 x 135 ft. Cost over \$80,000 with equipment. Engineering Systems, Inc., 221 North LaSalle Street, is architect and engineer.

Commercial Metal Products Co., 2251 West St. Paul Avenue, Chicago, lighting fixtures, reflectors, spun metal specialties, etc., has asked bids on general contract for two-story addition, 125 x 200 ft. Cost close to \$100,000 with equipment. Cohen & Kogen, 217 West Ontario Street, are architects.

Revere Copper & Brass, Inc., 230 Park Avenue, New York, and 2200 North Natchez Street, Chicago, plans new plant near present works in last noted city for production of cartridge cases, bullet jackets and other ammunition brass products for Government. Cost about \$10,000,000 with equipment. Appropriation in that amount will be furnished by Defense Plant Corp., Washington.

Lempco Products, Inc., Bedford, Ohio, crankshaft and other grinders, electric and hydraulic presses, has let contracts for an

addition which will increase its assembly facilities about 200 per cent.

Jeffrey Mfg. Co., Columbus, Ohio, has awarded contract to E. Elford & Son for a welding shop addition, 70 x 281 ft., to cost about \$50,000.

Western States

• **Super-Cold Corp.**, 1020 East Fifty-ninth Street, Los Angeles, commercial refrigerators, etc., has approved plans for one-story addition, 117 x 250 ft. Cost over \$100,000 with equipment. Train & Schaefer, Third and Hill Building, are architects.

International Harvester Co., 201 Potrero Avenue, San Francisco, plans new one-story plant at Twenty-sixth and Cypress Streets, Oakland, Cal. Cost over \$450,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 20 for one motor-driven turret punch (Schedule 6645); until May 22 for 1580 carbon steel boiler tubes (Schedule 6647) for Mare Island Navy Yard.

Martinac Shipbuilding Corp., 1404 East D Street, Tacoma, Wash., will carry out expansion and improvements, including two new shipways, one-story addition to woodworking shop, one-story equipment storage and distributing building, extensions in dock facilities and other work. Cost over \$200,000 with equipment. Award recently was made for one-story structural and mechanical shop, 115 x 156 ft.

Crown-Willamette Paper Co., Camas, Wash., has let general contract to Reimers & Jolivet, Railway Exchange Building, Portland, for four-story addition, 110 x 120 ft., for expansion in converting mill, and storage and distributing division. Cost over \$150,000 with equipment.

Board of Education, 1151 South Broadway, Los Angeles, has let general contract to J. & B. Construction Co., 5572 Valley Boulevard, for new one-story school of aeronautics, 60 x 188 ft., near municipal airport. Cost over \$75,000 with equipment. A. S. Nibecker, Jr., is architect for board.

Plant Rubber & Asbestos Works, 537 Brannan Street, San Francisco, magnesia products, has begun construction of new one-story mill at Emeryville, Cal. Cahill Brothers, 206 Sansome Street, San Francisco, are general contractors. Cost about \$250,000 with equipment.

Canada

• **Canadian General Electric Co.**, 212 King Street West, Toronto, has approved plans for one-story addition for a hydrogen-manufacturing unit. Cost over \$85,000 with equipment.

Coca-Cola Co. of Canada, Ltd., 90 Broadview Avenue, Toronto, has let general contract to Carter-Halls-Aldinger Co., Ltd., 670 Taylor Street, for two-unit, two-story mechanical-bottling, storage and distributing plant, about 180 x 225 ft., at Vancouver, B. C. Cost over \$350,000 with equipment. Mathers & Holdenby, 96 Bloor Street West, Toronto, are architects.

Federal Foundries & Steel Co., Ltd., Philip Street, London, Ont., steel castings, etc., plans one-story addition to branch plant at Sandwich, Ont., and improvements in present works. Cost close to \$50,000 with equipment.

G. A. Durham & Co., Ltd., 1523 Davenport Road, Toronto, steam heating and power plant specialties, will build an addition to cost about \$50,000, with equipment.

American Can Co., Medical Arts building, Hamilton, Ont., will build plant addition to cost \$50,000 and has awarded structural steel contract to Hamilton Bridge Co., Ltd. W. H. Cooper Construction Co., Medical Arts building, is general contractor.

Aluminum Co. of Canada, Ltd., 1155 Metcalfe Street, Montreal, will build a \$200,000 plant addition, including new pot rooms, and has awarded general contract to Foundation Co. of Canada, Ltd., 1538 Sherbrooke Street West.

Chromium Mining & Smelting Corp., Ltd., Sault Ste. Marie, Ont., will build plant addition to cost \$150,000 for which general contract has been awarded to Belmont Construction Co. A. Olsen, care of company, is engineer.